

In a recent note in this review (*Leibniz e gli Zenonisti*, n. 3, 2001, pp. 15-22) Paolo Rossi stresses the importance of a philosophical sect that he claims has been unjustly ignored in accounts of the history of modern philosophy, the Jesuit philosophers of Louvain and Spain of the late sixteenth and early seventeenth century known as the Zenonists. The occasion for his complaint is Massimo Mugnai's admirable new introduction to Leibniz's thought (*Introduzione alla filosofia di Leibniz*, Torino, Einaudi, 2001), which in all other respects than its failure to mention the Zenonists, Rossi compliments and commends: justly, for in my opinion it is the best introduction to Leibniz yet written.

At issue is how Leibniz's theory of substance is related to the problem of the composition of the continuum. The claim implicit in Rossi's note, and signalled by its title, is that this question cannot adequately be understood without reference to the views of the Zenonists. In his review, as in his recent book *Le sterminate antichità*, Rossi establishes this obliquely by a series of citations from Leibniz's works showing the latter's knowledge of the views of the Zenonists, and their relevance to his own solution. His review also contains the subsidiary criticism that Mugnai has depended on certain analyses of the development of Leibniz's thought on this problem, mine included, that are oblivious to such external contexts as that of these Jesuit thinkers. Concerning Rossi's specific charges here—his depiction of myself and Samuel Levey as "American analytic philosophers" and as knowing nothing of the Zenonists—it is not necessary to say anything more, since Mugnai has made what I consider to be a more than adequate reply on our behalf. But the question Rossi has raised concerning the role and influence of the Zenonists on seventeenth century thought is a very interesting one, and given its wider significance, perhaps I may be permitted to contribute a few further reflections on the subject.

I should say to begin with that I have no vested interest in the defence of orthodoxy here. On the one hand, I have no sympathy for a canon that views the history of philosophy as the history of epistemology, thereby excluding figures as important as Bruno, Diderot, Priestley and Boscovich, and which generally fails to appreciate the significance of currents of materialist thought and religiously motivated reactions to them throughout the early modern period. In particular, I believe the role of late sixteenth and early seventeenth century Epicureanism in the genesis of modern science has been very much underappreciated. On the other, I also agree with the tenor of Rossi's criticism of much analytic philosophy, which proceeds by ignoring all historical context and "treating Leibniz as if he were a professor in some U.S. university and engaging him [intrattendosi con lui] in friendly conversation" (19); although, as Mugnai rightly notes, this is relatively rare in recent Leibniz studies, despite Russell's influence. Nor, finally, would I have any objection if the views that Samuel Levey and I have attributed to Leibniz as his own, and arising from an internal development of his thought, were in fact rather derived by him from the Zenonists. Certainly Leibniz was aware of their views on the continuum, as Rossi has demonstrated, and if it could be demonstrated that the unextended points of the Zenonists were the originals from which Leibniz derived his monads, as Rossi suggests, this would constitute an exciting and important contribution to our understanding of seventeenth century thought. We are already indebted to Rossi for his seminal work in showing the importance of the Zenonists as a source for Vico, and possibly also for the Croatian Jesuit Roger Boscovich; if Leibniz's monadology were also

derived from this source, the rehabilitation of the Zenonists as a major source of early modern philosophy would be established.

Unfortunately, though, despite evidence that Leibniz found the Zenonist views attractive as a teenager, the proposition that their mathematical points were the chief source for his monads does not appear sustainable. To begin with, there is the problem, already noted by Mugnai, of the deep incompatibility between Leibniz's philosophy of the continuum and that of the Zenonists. For whereas Leibniz conceived the physical continuum as actually infinitely divided into extended parts, the Zenonists construed it as finitely divided into unextended points. (As Rossi's anonymous Jesuit wrote in 1670 (*Le sterminate antichità*, p. 94), the Zenonists were those who followed "the ancient opinion of Zeno, who denied that the continuum is divisible to infinity".) Leibniz's monads or simple substances, on the other hand, although unextended, are not parts of the physical continuum, but are rather presupposed by it; and according to him, while physical points or atoms are only apparently indivisible, mathematical points, though strictly indivisible and unextended, cannot be construed as parts of the continuum without falling into contradiction. Leibniz says as much in the passage quoted by Rossi from the *Système nouveau*:

But atoms of matter are contrary to reason, quite apart from the fact that they are still composed of parts [...] Only atoms of substance, that is to say real unities absolutely devoid of parts, can be the sources of actions, and the first absolute principles of the composition of things, and as it were the ultimate elements in the analysis of substantial things. They might be called metaphysical points; they have a kind of vitality and a sort of perception; mathematical points are their points of view for expressing the universe. But when a corporeal substance is contracted, all its organs together form what is with respect to us a mere physical point. Thus physical points are divisible only in appearance; mathematical points are exact, but are nothing but modalities; only metaphysical or substantial points (constituted by forms or souls) are exact and real, and without them there would be nothing real, since without true unities there would be no multiplicity.<sup>1</sup>

Still, these objections based on Leibniz's mature position are not by themselves fatal to Rossi's thesis of a Zenonian origin of Leibnizian substantial points. For it may be objected that (i) Leibniz reached these conclusions only in his mature philosophy, whereas in his youth he had composed the physical continuum from unextended points; and that (ii) in offering his substantial points as an alternative to Epicurean atomism, Leibniz was following the lead of the Zenonists. This much is suggested by Rossi in his note when, observing that Leibniz "had a familiarity with many of the ponderous Jesuit

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<sup>1</sup> G. W. Leibniz, *Scritti filosofici*, I, pp. 452-53. I have quoted this passage more fully than Rossi did, including the passage about mathematical points which, for some reason, he elides: "*mathematical points* are their points of view for expressing the universe".

texts”, he construes the above passage from the *Système nouveau* as describing the “intellectual journey which led him from his initial embracing of atoms and the void to metaphysical points” (17). (Rossi also hints that Leibniz may have shared the Jesuits’ motivation to offer a philosophy of substance that was not, like the Epicurean, “incompatible with a belief in transubstantiation”.) On this reading, then, Leibniz, under the influence of the Zenonists, abandoned atoms and the void for points, and later developed this position into his mature doctrine of monads: “Leibniz thought that, after false atoms, and passing through points, history would finally come face to face with his monads, the true atoms.” (17)

But Rossi’s reading appears to me problematic. In the first place, in the above passage (and in other passages Rossi cites) Leibniz is giving a justification and explanation of his doctrine of points, not a description of how he came to it. And in an earlier passage in the *Système nouveau* where Leibniz does give such a summary description of his intellectual journey, there is no mention of the intermediate stage of points Rossi ascribes to him: “passing from atoms through points to monads”. Rather, Leibniz writes of having to have recourse to metaphysical points or atoms of substance directly, on realizing that it was impossible to find the principles of a real unity in matter alone, or what is purely passive.

Nevertheless, there is evidence of Zenonism in Leibniz’s early thought. For even if Zenonian points are not part of Leibniz’s self-described journey in the *Système nouveau*, he seems to allude to them in another autobiographical passage in the dialogue *Phoronomus* of 1689, where he has his spokesman Lubinianus say:

There is a great difference between my old opinions, which were pleasing to an adolescent, and those of which I approve now I am more mature. At first, when I had wandered out of the prickly thornbrakes of the scholars into the pleasanter pastures of more recent philosophy, [...] I came to condemn forms and qualities in material things, and reduced everything to purely mathematical principles; but since I was not yet versed in geometry, I persuaded myself that the continuum consists of points, and that a slower motion is one interrupted by small intervals of rest. And I indulged other dogmas of this kind, to which people are prone when they are willing to entertain every imagination, and do not notice the infinity lurking everywhere in things.<sup>2</sup>

This is a good deal more promising as a sign of the influence of the Zenonists, for not only do we find Leibniz acknowledging that he once upheld the composition of the physical continuum from points, but the reference to “not noticing the infinity” seems to signify that the points were only finite in number, as they were for the Zenonists, and the reference to “reducing everything to purely mathematical principles” also seems to point

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<sup>2</sup> *Phoronomus* (Dialogo 2) (July 1689); transcribed and annotated in a critical edition by A. Robinet, in *Physis*, v. 28, n. 23, 1991, 797-885: p. 803.

in their direction. But even more telling is his admission that he indulged the doctrine that “a slower motion is one interrupted by small intervals of rest”, a doctrine which (although it had roots in the doctrines of the Ash'arite theologians of medieval Basra) was famously associated in Leibniz's time with the Jesuit Francisco Arriaga, generally regarded as a spokesman for the Spanish Zenonists, and our chief source for the details of their views.

This putative Zenonist phase, though, is not a position that Leibniz adopts to displace atomism. For, as he tells us in the continuation of the above autobiographical sketch, he clung onto atomism long after abandoning these views:

But although when I became a geometer I relinquished these opinions, atoms and the void held out for a long time, like certain relics in my mind rebelling against the idea of infinity; for although I conceded that every continuum could be divided to infinity in thought, I still did not grasp that in reality there were parts in things exceeding every number, as a consequence of motion in a plenum. Finally, not only was I freed from this scruple, but I also began to realize that there was something more sublime in bodies which the imagination is not capable of grasping. (*ibid.*)

Now we come to the question: is there then any direct textual evidence for such a Zenonist phase in Leibniz's early thought? Here it is tempting to see his talk of composing the continuum from points as an allusion to his doctrine of points in the *Theoria motus abstracti*, which he published in 1671. For there, prior to “becoming a geometer” under Huygens' supervision in his four years in Paris, he did indeed compose the continuum from unextended points. But several considerations weigh against this being the Zenonist phase alluded to in the above passage.

First, the *Theoria* is decidedly infinitist: the number of points is actually infinite. In fact, Leibniz had demonstrations of the actual infinite division of matter from as early as 1666.

Second, these points are interpretations of Cavalierian indivisibles, coloured by Leibniz's reading of Hobbes. Although unextended, they are supposed to be smaller than any sensible magnitude, and yet to have parts that lie in a certain situation and order. (Leibniz appeals to the Scholastic theory of signs to justify these latter novel properties of points, which are designed to circumvent Aristotle's objections to composing the continuum from points). This makes them quite unlike anything envisaged by the Zenonists.

Third, Leibniz uses the doctrine of points in the *Theoria* to provide the foundation for his theory of cohesion in the *Hypothesis physica nova* of 1671, according to which continuous spherical bodies (*bullae*) are made up by rings of indivisible points pressing on each other and thus cohering, since the neighbouring points are in an endeavour

(conatus) to penetrate. This theory (I have argued elsewhere)<sup>3</sup> probably owes its inspiration to Julius Caesar Scaliger's theory of *miston* (or chemical composition) in terms of fusion of *minima naturalia* into a true union, a theory adopted by Daniel Sennert, who interpreted the *minima* as atoms containing immaterial forms. Leibniz's points, like Sennert's atoms, contain minds that are the principles of their actions and passions. (Indeed, at any given moment a body simply is a nexus of endeavours (conatus), each of which is synonymous with a thought, so that "every body can be understood as a momentaneous mind.") Thus while Cavalieri's points are mathematical, it can hardly be said that Leibniz is using them to reduce everything to mathematical principles. Whatever traces of Zenonism one can see in the idea of unextended points composing a continuum, they are by now submerged in a welter of other influences from a rich variety of contexts.

Fourth, in the *Theoria* Leibniz explicitly rejects the Arriagan theory of the interruption of motion by rests: «(7) Motion is continuous, i.e. not interrupted by any little intervals of rest. For (8) once a thing comes to rest, it will always be at rest, unless a new cause of motion occurs.» One of the huge advantages of the theory in his eyes is that it enables him to reinstate the continuity of motion, now conceived as composed of a continuous stretch of infinitely small motions or conatuses. Here I say "reinstate", because we have textual evidence of Leibniz previously maintaining that a slower motion is one interrupted by small intervals of rest. In a draft of 1670 entitled *De rationibus motus* we find him writing:

Whatever moves more slowly does so because of several little intervals of rest (quietulas) interspersed. What moves more quickly does so because of fewer. A little interval of rest is an existence in the same place for a time smaller than any given. (A VI ii 171)

Here the first two sentences could be straight from Arriaga. The third, though, shows a crucial difference: instead of composing the continuum from alternating finite motions and rests, Leibniz posits that a body rests between assignable points in its motion for a time smaller than any given, i.e. for an infinitely small time. As I have argued elsewhere (2002), this constitutes a novel theory of motion as consisting in an infinity of different places occupied at assignable times separated by infinitesimal and unassignable rests. So even this theory, abandoned soon afterwards for the theory of points in the *Theoria*, is more a vestige of an Arriagan view than an instance of Zenonism.

So far I have said nothing about any religious motivations Leibniz might have had for his views on the continuum. Here I differ with Rossi, in that I have argued elsewhere that such motivations are perhaps discernible in Leibniz's abiding *attachment* to atomism, rather than his repudiation of it. In particular, his adoption of atoms containing minds or souls that act as their principles of individuation and of action enabled him to

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<sup>3</sup> G. W. Leibniz, *The Labyrinth of the Continuum*, ed. and transl. Richard T. W. Arthur: Introduction; also "The Enigma of Leibniz's Atomism", forthcoming in *Oxford Studies in Early Modern Philosophy*, ed. Stephen Nadler and Daniel Garber.

ground the theory of *traducianism*, upheld by most Lutherans, which maintained that the soul was propagated through the parents' seeds in biological generation, rather than introduced from the outside at conception. The same idea grounds his theory of *transformation*, a variant of preformation, according to which the birth and death of an organism were to be understood as transformations of the organic body encompassing an immortal soul or substantial form, rather than the birth and death of the soul itself.

That is, I argue that the textual evidence does not support Leibniz's claim that it was only after he came to see the necessity of a principle of action in bodies that he rejected atomism, unless that refers to a period of Epicureanism in his teenage years of which we have no record. For he upheld atoms containing minds as late as 1676, and only abandoned them (or so I argue) after he had arrived at a new syncategorematic interpretation of infinite division in 1676, and had found a viable candidate for his principle of action in terms of primitive force on discovering the conservation of *vis viva* in 1678. Meanwhile, it does not appear likely that making his doctrine of substance compatible with the doctrine of transubstantiation was one of Leibniz's motivations for his monadology. For it is a premise of his long correspondence with the Jesuit Des Bosses that something more than monads would be required for the bread and wine to be regarded as substances.

In conclusion, it seems likely that Leibniz was influenced by the views of the Zenonists in his youth. But by the time he published his *Hypothesis physica nova* at age 24, his views on the continuum reflect a welter of other sources at odds with the Jesuits' theses. Although one can trace a lasting influence on Leibniz of the idea that there have to be some kind of "points" which are "the first absolute principles of the composition of things, and as it were the ultimate elements in the analysis of substantial things", after 1676 he abandons for good the idea that these could compose the continuum. Instead he opts for substantial points which are the sources of a substance's actions and passions. His arguments for this are dynamical ones, and lie outside of the scope of the problematic of the Zenonists. Mugnai was therefore perfectly justified, I believe, in neglecting to discuss the Zenonists as one possible influence on one aspect of Leibniz's thought, especially in the interests of the economy demanded by an introductory book on the whole of his philosophy. Zenonism, then, was not a principal source of Leibniz's monads.

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Massimo Mugnai, "Paolo Rossi, gli zenonisti e Leibniz," *Rivista di storia della filosofia*, n. 4?, 2001?.

Paolo Rossi, "Leibniz e gli zenonisti," *Rivista di storia della filosofia*, n. 3, 2001, pp. 15-22.

Paolo Rossi, *Le sterminate antichità e nuovi saggi vichiani*, La Nuova Italia, Firenze, 1999.

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