



Hasdai Crescas, Gianfrancesco Pico, Giordano Bruno: On Infinite Space and Time

Miguel Á. Granada

Universidad de Barcelona  

<https://dx.doi.org/10.5209/ashf.88188>

Recibido: 23 de abril de 2023 / Aceptado: 05 de junio de 2023

ENG Abstract: This article examines the conception of infinite space and time in Hasdai Crescas, Gianfrancesco Pico della Mirandola and Giordano Bruno. If Crescas' presence is explicit in Gianfrancesco Pico's *Examen vanitatis* (1520), the reception by Bruno, who never mentions him, was postulated by Harry A. Wolfson in 1929. More recently, David Harari and Mauro Zonta posited the intermediary role of an unknown Jewish author. However, a comparison of the critique of Aristotle by Crescas and Bruno shows that, apart from two points, Bruno was able to reach his positions, independently of Crescas, from his own critical reading of Aristotle and from his knowledge of the developments in medieval scholasticism and the Neoplatonic concept of time. Significantly, Crescas qualifies space and time as attributes of God in a purely metaphorical sense, a question that Pico leaves aside, while Bruno conceives of infinite space and duration, together with matter, as real attributes of God, who, as an indifferent unity of opposites, is both mind and intellect as well as space and matter.

Keywords: Hasdai Crescas; Gianfrancesco Pico; Giordano Bruno; Space; Time; Matter.

ES Hasdai Crescas, Gianfrancesco Pico, Giordano Bruno: Sobre el espacio infinito y el tiempo

ES Resumen: Este artículo examina la concepción del espacio infinito y del tiempo en Hasdai Crescas, Gianfrancesco Pico della Mirandola y Giordano Bruno. Si la presencia de Crescas es explícita en el *Examen vanitatis* (1520) de Pico, su recepción por Bruno, que nunca lo menciona, fue postulada por Harry A. Wolfson en 1929. Más recientemente, David Harari y Mauro Zonta han afirmado el papel intermediario de un autor judío desconocido. Sin embargo, una comparación de la crítica de Aristóteles efectuada por Crescas y Bruno pone de manifiesto que, excepto dos puntos, Bruno pudo alcanzar sus posiciones con independencia de Crescas, a partir de su propia lectura crítica de Aristóteles y de su conocimiento de los desarrollos de la escolástica medieval y del concepto neoplatónico del tiempo. La significativa calificación por Crescas del espacio y del tiempo como atributos de Dios en un sentido puramente metafórico, una cuestión que Pico deja a un lado, deja paso en Bruno a la calificación del espacio infinito, de la duración y también de la materia como atributos reales de Dios, que es a la vez mente e intelecto, espacio y materia, en tanto que unidad indiferente de los opuestos.

Palabras clave: Hasdai Crescas; Gianfrancesco Pico; Giordano Bruno; espacio; tiempo; materia.

Summary: 1. Gianfrancesco Pico della Mirandola and Hasdai Crescas. 2. Giordano Bruno, Gianfrancesco Pico and Crescas. 3. Bruno on Space and Time as Attributes of God. 4. Conclusion. 5. Bibliography.

How to Cite: Granada, M. Á. (2024) "Hasdai Crescas, Gianfrancesco Pico, Giordano Bruno: On Infinite Space and Time". *Revista Anales del Seminario de Historia de la Filosofía*, 41 (1), 195-212.

Hasdai Crescas' (Barcelona 1340-Zaragoza 1410/11) *Or Adonai* or *Or ha-Shem* remained in manuscript until the first edition, printed in Ferrara in 1555. Unlike

Maimonides' *Guide of the Perplexed*, Crescas' work was never translated into Latin and has only recently been translated into modern European languages.¹

¹ H. Crescas, *Lumière de l'Éternel*. Trans. É. Smilévitch. Paris/Strasbourg: Hermann, 2010; id., *Light of the Lord*. Trans. R. Weiss. Oxford: OUP, 2018. In 1929, Harry Austryn Wolfson edited and translated into English the twenty-five propositions of Part I of Book I,

However, in the first half of the 16th century Crescas' work was known to the Italian Christian philosopher Gianfrancesco Pico della Mirandola (1469-1533), nephew of the more famous Giovanni Pico della Mirandola (1463-1494), who made use of it in his *Examen vanitatis doctrinae gentium et veritatis christianae disciplinae*, a work published in Mirandola in 1520.² The presence of Crescas' work in the *Examen vanitatis* was noted as early as 1866 by Manuel Joël in his monograph *Don Hasdai Creskas' religionsphilosophische Lehren in ihrem geschichtlichen Einflusse*, and after being confirmed by Wolfson,³ it has been examined by Charles B. Schmitt in his book on the young Pico.⁴ Pico takes up and makes use of Crescas' critique in *Or Adonai* of the Aristotelian concepts of motion, time, place and void, within the framework of his own critique of Aristotle's physics in Book VI – which is the final part of the *Examen vanitatis*.⁵

1. Gianfrancesco Pico della Mirandola and Hasdai Crescas

Both Joël and Wolfson pointed out that Gianfrancesco Pico could hardly possess the necessary knowledge of Hebrew to read Crescas' work, so he certainly owed his knowledge of it and accessed the critique of those Aristotelian concepts through an intermediary who provided him with a translation.⁶ Schmitt has pointed out that this intermediary may have been the biblical scholar Sante Pagnini.⁷ Pagnini (Lucca ca. 1470-Lyon 1541) entered the Dominican order in Fiesole in 1487, was under the influence of Hieronymus Savonarola (1452-1498) in the Florentine convent of San Marco and was in contact with the two Picos.⁸ The edition of Gianfrancesco Pico's works includes two letters, unfortunately not dated, but undoubtedly subsequent

to the publication of the *Examen vanitatis* (1520).⁹ In them, the young Pico congratulates Pagnini on the completion, after twenty-five years of hard work, of his Latin translation of the Old Testament from Hebrew and notes:

Ego quidem (ut de me dicam) post Latinas et Graecas literas multis laboribus versatas, cum nihil aut parum profecisse videar, ut antiqua ipsa nostrae Religionis arcana prorsus haurirem, nisi et Hebraeas perdiscerem, conducto Hebraeo Isacio, lochanae illius, quem Ioannes Picus patruus meus sibi magistrum ascivit, filio, eo usus sum praeceptore. Sed bellis, quae plurima mihi illata sunt, impeditus, et quibus incumbendam voluminibus absolvendis distractus, quam parum a calce promoverim, tu ipse testis, cui me postea erudiendum tradidi.¹⁰

It is, therefore, possible that it was Pagnini who provided Gianfrancesco Pico with the translations of Crescas' critique of the concepts of Aristotelian physics that he used in the sixth book of the *Examen vanitatis*.¹¹ The *Examen* was, in many ways, a work of similar intent to *Or Adonai*. Crescas had been angered at Maimonides' *Guide* by its Peripatetic rationalism and its interpretation of the Law as coinciding in its esoteric (true) sense with the philosophy of Aristotle. This was the way the *Guide* was being read in the tradition of Hebrew Averroism (Moses of Narbonne, Levi ben Gerson), without taking into consideration the presence in Maimonides of a skepticism towards philosophy, as Shlomo Pines and more recently Josef Stern have argued.¹² In order to save faith and prophecy, Crescas argued against Maimonides' philosophical arguments, showing that they had no demonstrative value and opposing them other rationally possible conceptions.¹³ Thus, he opposed a whole series of rational considerations to the 25 propositions that Maimonides presents

with Crescas' replies, in his monumental *Crescas' Critique of Aristotle: Problems of Aristotle's Physics in Jewish and Arabic Philosophy*. Cambridge, MA: Harvard University Press, 1929, pp. 129-315.

² The English translation by Roslyn Weiss confuses Gianfrancesco Pico with his uncle.

³ H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, p. 34.

⁴ C. B. Schmitt, *Gianfrancesco Pico della Mirandola (1469-1533) and his Critique of Aristotle*. The Hague: Martinus Nijhoff, 1967.

⁵ Gianfrancesco Pico della Mirandola, *Examen vanitatis doctrinae gentium et veritatis christianae disciplinae*. Mirandola: Ioannes Mazochius, 1520. We will cite the work from the reprint in Giovanni and Gianfrancesco Pico della Mirandola, *Opera omnia*. Basel: Pietro Perna, 1557 (reprint Hildesheim: Georg Olms Verlag, 1969), pp. 710-1264. There is a recent edition: *Examen vanitatis doctrinae gentium et veritatis christianae disciplinae*. Ed. N. Egel, Hamburg: Felix Meiner Verlag, 2022 (our thanks to Dario Tessicini for the reference to this edition, which we have not been able to consult).

⁶ M. Joël, *Don Hasdai Creskas' religionsphilosophische Lehren in ihrem geschichtlichen Einflusse*. Breslau: Schletter'sche Buchhandlung, 1866, p. 83; H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, p. 34. Joël and Wolfson mention *ibid.* Pico's work with the inaccurate title *Examen doctrinae vanitatis gentium*. In any case, Wolfson has carefully read the sixth book of the *Examen* in the chapters where Pico makes use of Crescas, pointing out correspondences, and extends, as we shall see, the brief mention of Giordano Bruno in Joël, p. 8 (where Bruno is put in relation to Spinoza) to an extensive confrontation of Crescas with Bruno.

⁷ C. B. Schmitt, *Gianfrancesco Pico della Mirandola*, *op. cit.*, pp. 27 and 130.

⁸ *Ibid.*, p. 130 note 4, refers, for the relations between them to Cecil Roth, *The Jews in the Renaissance*. Philadelphia: The Jewish Publication Society of America, 1959, pp. 146-147.

⁹ Giovanni and Gianfrancesco Pico, *Opera omnia*, *op. cit.*, pp. 1371-1376; in the second letter Pico mentions the already published *Examen vanitatis*: "nuper maiore, et cura, et diligentia, et opere vanitas doctrinae gentium a nobis detecta est, et Christianae disciplinae veritas celebrata, sex voluminibus sub Examinis titulo publicatis", p. 1375.

¹⁰ *Ibid.*, p. 1371; italics are added.

¹¹ D. Harari, "Some Lost Writings of Judah Abravanel (1465?-1535?) Found in the Works of Giordano Bruno (1548-1600)", *Sophar*, 10 (1992), p. 64, has proposed that the intermediary author may have been Judah Abravanel (Leone Ebreo), who, according to later testimony, wrote a work (now lost) entitled *De coeli harmonia*, dedicated to Gianfrancesco Pico della Mirandola.

¹² S. Pines, "The Limitations of Human Knowledge according to Al-Farabi, Ibn Bajja, and Maimonides", in I. Twersky (ed.), *Studies in Medieval Jewish History and Literature*. Vol. I. Cambridge, MA: Harvard University Press, 1979, pp. 82-109; J. Stern, *The Matter and Form of Maimonides's 'Guide'*. Cambridge, MA/London: Harvard University Press, 2013.

¹³ H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, pp. 124-125. For a recent assessment of Crescas' critique of Aristotle or, more precisely, of Maimonides' Aristotelianism, as basically negative and aimed at destroying contrary positions rather than positively proposing new ideas, see Y. T. Langermann, "East and West in Hasdai Crescas: Some Reflections on History and Historiography", in id. and J. Stern (eds.), *Adaptations and Innovations: Studies on the Interaction between Jewish and Islamic Thought and Literature from the Early Middle Ages to the Late Twentieth Century*. Paris/Louvain/Dudley, MA: Peeters, 2007, pp. 231, 243.

at the beginning of the second part of the *Guide* as premises for the demonstration of God's existence from physics, "all of which are demonstrated without there being a doubt as to any point concerning them. For Aristotle and the Peripatetics after him have come forward with a demonstration for every one of them".¹⁴ Thus, against the first proposition, which read "The existence of any infinite magnitude is impossible",¹⁵ Crescas maintained that "the argument [of Maimonides] is fallacious and a begging of the question"¹⁶ and ended by concluding that "it has been shown that on their own premises *an infinite incorporeal magnitude* [void space] *must exist*".¹⁷

For his part, Gianfrancesco Pico, a faithful and enthusiastic follower of Savonarola, intended with his *Examen vanitatis doctrinae gentium et veritatis christianae disciplinae* to continue the Savonarolian program of a skeptical critique – supported by the instrumental use of the sources of ancient skepticism, especially Sextus Empiricus – of the human capacity to attain truth by means of natural reason and experience, in order to establish the *vanity* of the philosophies received from the Greeks and especially from Aristotle and to conclude that the only source of truth resided in divine revelation through Scripture and therefore in Christianity.¹⁸

As we have already indicated, Crescas appears at the end of the *Examen*, in the sixth book, to support the refutation of Aristotle's physical concepts of movement, time, place and void.¹⁹ Schmitt punctually collects the arguments that Pico takes from the "Hebraeus Hasdai" or "Rabi Hasdai", referring always to Wolfson's edition and translation.²⁰

In his critique of the Aristotelian concepts of motion (*Examen*, VI, 2) and time (VI, 3) Pico relies solely on Crescas' arguments,²¹ present in propositions 8, 13 and 14 in the case of motion²² and in proposition

15 in the case of time.²³ As far as time is concerned, Pico presents in a very summarized and somewhat confusing way Crescas' rejection of the four premises on which the Aristotelian definition of time rests in proposition 15 of the Introduction to the second part of the *Guide*.²⁴

Rabbi Hasdai in no way assented to Moses the Egyptian [i.e. Maimonides], who had accepted the Peripatetic propositions as resting on a solid foundation, among which is that "time is the number of motion". For he [Crescas] affirms that time is measured by rest, although no motion ever takes place [...]. He defines time as follows (to use his own words): the measure of the continuity of motion or rest between two moments, so that the measure itself is the genus, and he rightly asserts that it seems that in the first place number cannot be genus, since it is a discrete quantity, whereas measure is a continuous [quantity]. Nevertheless, the soul measures motion and rest, so that, since time is said to be an accident [premise 1], he commands that the soul itself be referred to it; otherwise it would be false that it is an accident, extrinsic, since it also follows rest, which is privation, [...] so he asserts that it is false that time is joined to motion [premise 2], since it no less conforms to rest, which is opposed to it. It is also false that what has no motion is not contained under time [premise 4], since [intelligences] separated from matter lack motion and are usually placed under time.²⁵

Aristotle's arguments supporting that only circular motion is continuous.

¹⁴ Maimonides, *The Guide of the Perplexed*. Trans. S. Pines. 2 vols. Chicago/London: The University of Chicago Press, 1963, vol. II, p. 235; for the 25 propositions see pp. 235-239.

¹⁵ Maimonides, *The Guide of the Perplexed*, op. cit., p. 235.

¹⁶ H. A. Wolfson, *Crescas' Critique of Aristotle*, op. cit., p. 179; cf. the English translation H. Crescas, *Light of the Lord*, op. cit., p. 70.

¹⁷ H. A. Wolfson, *Crescas' Critique of Aristotle*, op. cit., p. 189; italics are ours. Cf. H. Crescas, *Light of the Lord*, op. cit., p. 73. Wolfson's work edits the Hebrew text with English translation of these 25 propositions of the *Guide* together with Crescas' criticism.

¹⁸ See C. B. Schmitt, *Gianfrancesco Pico della Mirandola*, op. cit.; M. Á. Granada, "Apologética platónica y apologética escéptica: Ficino, Savonarola, Gianfrancesco Pico", in id., *El umbral de la modernidad: Estudios sobre filosofía, religión y ciencia entre Petrarca y Descartes*. Barcelona: Herder, 2000, pp. 119-167. More recently, L. Pappalardo, *Gianfrancesco Pico della Mirandola: fede, immaginazione e scetticismo*. Turnhout: Brepols, 2014, where however Crescas is not mentioned.

¹⁹ Crescas' critique is presented in chapters II-VI, pp. 1183-1195 and 1208.

²⁰ C. B. Schmitt, *Gianfrancesco Pico della Mirandola*, op. cit., pp. 128-159.

²¹ Gianfrancesco Pico, *Examen vanitatis*, op. cit., pp. 1184-1185.

²² H. A. Wolfson, *Crescas' Critique of Aristotle*, op. cit., pp. 249-251, 279-281, 281-283 (cf. H. Crescas, *Light of the Lord*, op. cit., pp. 53, 57-58, 88-89); C. B. Schmitt, *Gianfrancesco Pico della Mirandola*, op. cit., pp. 131-136. Pico also records Crescas' refutation of Moses of Narbonne's argument in support of Maimonides (Wolfson, pp. 251-253; cf. H. Crescas, *Light of the Lord*, op. cit., p. 85) and his disqualification as "fables" (Wolfson, p. 279: "fancies and conceits"; cf. H. Crescas, *Light of the Lord*, p. 88: "imaginings and delusions") of

²³ H. A. Wolfson, *Crescas' Critique of Aristotle*, op. cit., pp. 283-291 (H. Crescas, *Light of the Lord*, op. cit., pp. 58-59, 89-90); C. B. Schmitt, *Gianfrancesco Pico della Mirandola*, op. cit., pp. 136-138.

²⁴ Maimonides, *Guide of the Perplexed*, op. cit., vol. II, p. 237; H. A. Wolfson, *Crescas' Critique of Aristotle*, op. cit., p. 283: "Time is an accident that is consequent on motion and is conjoined with it. Neither one of them exists without the other. Motion does not exist except in time, and time cannot be conceived except with motion, and whatsoever is not in motion does not fall under the category of time" (cf. H. Crescas, *Light of the Lord*, op. cit., p. 58). Crescas begins his critique, which extends throughout pp. 287-291, by declaring that "the four premises which this proposition contains [...] are all false", p. 287 (H. Crescas, *Light of the Lord*, op. cit., p. 89).

²⁵ Gianfrancesco Pico, *Examen vanitatis*, op. cit., pp. 1184-1185: "R. Hasdai Mosi Aegyptio minime assensus, qui propositiones Peripateticas tanquam solido nixas fundamento receperat, inter quas illam: tempus esse numerum motus. Quietem namque mensurari tempus affirmat, etiam si nunquam motus inveniretur [...]. Definit autem ipsum tempus ita (ut eius verbis agam) mensura continuitatis vel motus, vel quietis, quae inter duo momenta: ut genus sit ipsa mensura, viderique iure affirmat numerum genus esse primo non posse, cum sit discretæ quantitatis, mensura continua. Motum autem et quietem dimittitur animus: quare cum tempus accidens appelletur, ad eum ipsum animum referri iubet, alioquin falsum esset [in the text: essent], illud esse accidens, extrinsecus, quoniam et quietem consequitur quae privatio est, [...] quare falsum [in the text: fallum] affirmat esse ut tempus dicatur motui iunctum, quando et quieti quae illi opponitur non minus aptetur. Falsum item, quod non habet [in the text: habent] motum, id sub tempore non contineri, quandoquidem quae sunt a materia seiuncta motum carent [in the text: caret] et sub tempore solent reponi." Pico omits premise 3, which says "time cannot be conceived except with motion" (H. A. Wolfson, *Crescas' Critique of Aristotle*, op. cit., p. 285; H. Crescas, *Light of the Lord*,

As Wolfson pointed out in his commentary and advanced in a brief, masterly article,²⁶ Crescas rejects the Aristotelian concept, which (like Plato's) essentially links time to motion (specifically to the first motion, which is the daily one of the first mobile, the universal time of the world), conceives time as an accident of the corporeal substance (like place) and therefore excludes that separate intelligences (therefore God) exist in time. On the contrary, Crescas adopts the Neoplatonic concept (formulated by Plotinus, Iamblichus, Damascius and Simplicius), according to which time is a continuous magnitude and *duration*, and "exists only in the soul".²⁷ Time is, therefore, prior to and independent of motion and rest, which are measured by it, certainly through the motion of a body (the daily revolution of the first mobile around the Earth) taken as the first measure. Crescas' time, as Wolfson points out,

in its purely ideal nature, when conceived absolutely apart from motion, is indeterminate and immeasurable. It is an unqualified limitless duration. It does not become a subject of measurement unless it is conceived in connexion with an external moving object. [...] through motion we are enabled to get a part of definite time out of the indefinite duration which has an independent conceptual existence of its own.²⁸

As duration (infinite, since beginning and end are established by motion), time also affects the separate intelligences, which exist in it.²⁹ Crescas can say, therefore, that "the passage of Rabbi Jehudah, son of Rabbi Simon, which reads: 'It teaches us that the order of time had existed previous to that' [the creation], may be taken in its literal sense".³⁰ As it will be shown below regarding space, time, as a continuous and infinite duration, can be said, *metaphorically*, to be the duration of God.³¹

Gianfrancesco Pico was not able to see all these implications of Crescas' concept of time, nor was he certainly interested in them. But we must keep in mind that this concept of time, as shown by Wolfson, comes to Crescas from the Neoplatonic tradition, circulates in the Islamic and Jewish tradition before and contemporary to him (where it was affirmed and

refuted) as well as in the Latin scholastic tradition. Crescas' only contribution is to have introduced rest in the definition of time.³²

In his criticism of the Aristotelian concept of place (*Examen*, VI, 4, pp. 1186-1190) and of the Aristotelian rejection of the void (VI, 5, pp. 1190-1194), Pico introduces Crescas' critique as support for his first and fundamental source: the critique by the Alexandrian commentator of the *Physics* John Philoponus (490-574). In the case of the void, Crescas' critique is collected in the brief chapter 6 (pp. 1194-1195). Philoponus, too, was a severe critic of Aristotle, but his sharp criticism of the Aristotelian concept of place and void was in 1520 still unknown to the large Latin public, for his *Commentary on the Physics*, containing the Corollaries on Place and Void, was only published in the original Greek in 1535 (Venice) while the Latin translation appeared, also in Venice, in 1539, with successive editions in 1546, 1550, 1554, 1558, 1569 and 1581.³³

As far as place is concerned, Pico presents in considerable detail Philoponus' critique of the Aristotelian definition as "the innermost motionless boundary of what contains it [the thing placed]" (*Physics*, IV, 4, 212a 20) and his alternative conception of space as an incorporeal three-dimensional extension, empty, but able to receive and contain bodies and in fact never empty.³⁴ This conception inspired sixteenth-century natural philosophers Bernardino Telesio (1509-1588) and Giordano Bruno (1548-1600) to formulate the new concept of absolute and homogeneous space. In this framework, Crescas is inserted by the young Pico in a brief mention that gathers, in a rather confusing way and with a truncated text, two passages of *Or Adonai* corresponding to the Second part of proposition 1, that is, to the refutation of the first proposition in Maimonides' *Guide*, which affirms that there is no infinite magnitude. These passages pertain to Crescas' Second Speculation, which examines "the arguments which he [Maimonides] has framed to prove the impossibility of a corporeal infinite magnitude"³⁵ and

op. cit., p. 58), perhaps because he has mistakenly thought that it is like premise 2 ("time is conjoined with motion").

²⁶ H. A. Wolfson, "Note on Crescas's Definition of Time", *Jewish Quarterly Review*, 10 (1919), pp. 1-17.

²⁷ *Ibid.*, p. 10. Cf. H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, p. 289 (H. Crescas, *Light of the Lord*, *op. cit.*, p. 89). But Aristotle had already said that "if nothing but soul, or in soul reason, is qualified to count, it is impossible for there to be time unless there is soul", *Physics*, IV, 14, 223 a 25-26, in Aristotle, *The Complete Works. The Revised Oxford Translation*. Ed. J. Barnes. 2 vols. Princeton: Princeton University Press, 1984, vol I, p. 377. Neoplatonism magnifies the ideality of time and diminishes its physical reality to the point of practically denying it.

²⁸ H. A. Wolfson, "Note on Crescas's Definition of Time", *op. cit.*, 10-11.

²⁹ H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, p. 291: "the Intelligences, though immovable, may still have existence in time"; cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 90.

³⁰ H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, p. 291.

³¹ W. Z. Harvey, *Physics and Metaphysics in Hasdai Crescas*. Amsterdam: J. C. Gieben, 1998, p. 29: "as God may be compared with infinite space, so He may be compared with eternal time".

³² Aristotle had already said, however, that time "will be the measure of rest too", *Physics*, IV, 12, 221b 8-9, *op. cit.*, note 27.

³³ See the English translation in Philoponus, *Corollaries on Place and Void, with Simplicius, Against Philoponus on the Eternity of the World*. Trans. D. Furley and C. Wildberg. London: Bloomsbury, 1991. On the originality and importance of Philoponus' criticism, see R. Sorabji, *Matter, Space, & Motion: Theories in Antiquity and Their Sequel*. Ithaca, NY: Cornell University Press, 1988 and id. (ed.), *John Philoponus and the Rejection of Aristotelian Science*. London and Ithaca, NY: Cornell University Press, 1987. Philoponus' criticism of the Aristotelian doctrine of motion and his assertion of the possibility of finite speed motion in a vacuum were known from the Latin Middle Ages as the doctrine of Avempace and through the critique by Averroes (in his *Commentary on the Physics*, book IV). C. B. Schmitt, *Gianfrancesco Pico della Mirandola*, *op. cit.*, p. 149, attributes Pico's preference for Philoponus to the greater detail of his criticism and to Pico's "delight in citing esoteric sources such as Sextus Empiricus, Hasdai Crescas, [...] who were by no means well known in the early sixteenth century".

³⁴ Gianfrancesco Pico, *Examen vanitatis*, *op. cit.*, p. 1189: "Spacium itaque locus est, ex sese corpore quidem vacuum, sed nunquam tamen re ipsa vacuum, sicuti materia aliud est quam forma, nunquam tamen sine forma."

³⁵ H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, p. 191; *Light of the Lord*, *op. cit.*, p. 74.

states that “Aristotle’s definition of place will give rise to many absurdities”.³⁶

The first passage points out, in relation to the sublunary elements, that the Aristotelian concept of place is not suitable for the parts of the total element, because if air (for example) has the lower limit of the sphere of fire as the place of its upper part, it is impossible to say what is the place of the intermediate parts, which are also surrounded by air.³⁷

The second passage argues that “it proves false that all the bodies that are placed agree with their places, both with respect to the circumference of the supreme heaven and also to the Earth, to which is assigned a place, not a surface, but a tiny point to which does not correspond properly the name of place”.³⁸ Pico compresses to the maximum the text of Crescas, which points out the difficulty that statements like the following represent for the Aristotelian doctrine of place: “the outermost sphere, having no surrounding, equal and separate surface [...] cannot have any essential place”, “a rotating sphere must have a stationary centre, with reference to which the sphere could be said to exist in place”, and “when we were looking for a place for the element earth, we decided that it is the absolute below, but the absolute below is not a surface but rather a point”.³⁹

At this point, Crescas affirms: “Consequently, it will be in accordance with the nature of truth, which is evident by itself and consistent with itself in all points, if true place is identified with the void.”⁴⁰ And the void is studied by Pico next (chapter VI, 5), demonstrating – from Philoponus’ *Corollaries on Place and Void* – that Aristotle’s arguments against the existence of the void are inconclusive, in particular the objection that motion would be impossible because, without resistance from the medium, it should be of

infinite velocity and therefore instantaneous.⁴¹ Thus, the refutation of the Aristotelian reasons against the vacuum confirms the prior affirmation of the vacuum as space, understood as a three-dimensional disembodied extension and receptacle containing the bodies that move through it.⁴²

Pico exposes Crescas’ reasons in favor of the void – understood as “dimension or incorporeal magnitude”, that is, as space independent of the bodies contained in it –⁴³ in a brief sixth chapter that summarizes Crescas’ “first speculation” against the first proposition of the *Guide* and its Aristotelian basis.⁴⁴ I will point out only: 1) the refutation of the Aristotelian denial of the infinite spatial dimension on the ground that, being a dimension, it must be a body and therefore would entail the penetration of dimensions when occupied by a body:

Parvi facit etiam illam non penetratorum corporum, ob dimensiones rationem, cum dimensiones materiae iunctas id efficere posse dicendum sit, non seiunctas, et ab omni prorsus materia separatas;⁴⁵

2) A void is possible outside the finite world and the medium is not a necessary condition for the motion to occur:

praeterea nihil efficere eas quae sunt excogitatae contra vacuum rationes, et fundatae super motu recto, quando intermedium nullum sit necessarium: et dici queat gravitatem et levitatem naturaliter corporibus inesse mobilibus, nec ea mediis indigere. Dici etiam possit omnibus corporibus inesse gravitatem, eaque vocari levia quae videlicet gravia sint minus, eaque ipsa moveri sursum ex eorum, quae magis gravia sunt impetu, et violentia. [...] Sed quod attinet ad Hebraeum omnia corpora gravia

³⁶ H. A. Wolfson, *Crescas’ Critique of Aristotle*, *op. cit.*, p. 195; *Light of the Lord*, *op. cit.*, p. 75.

³⁷ Gianfrancesco Pico, *Examen vanitatis*, *op. cit.*, p. 1187: “proprius partium locus, quae ad totius motum agitantur, non est superficies circumdans aequalis adeo, ut seorsum habeat cum partibus loci convenientiam. Nam si (causa exempli) suprema pars aeris conveniet imae continentis, et circum valantis ignis, media tamen pars ei non ita conveniet, nec in suo naturali reponetur loco, qui si assereretur parti ipsi suapte natura congruere, tamen diversus haberetur a loco totius, et integri corporis collocati” [the proper place of the parts that are agitated to the movement of the whole, is not the surrounding surface, equal, so that separated, it has convenience with the parts of the place. For, if (for example) the upper part of the air agrees with the lower [part] of the continent and surrounding fire, the intermediate part will nevertheless not agree with it and will not be placed in its natural place, which, if it were claimed to agree by nature with the part itself, will nevertheless be different from the place of the whole and integrally placed body]. See C. B. Schmitt, *Gianfrancesco Pico della Mirandola*, *op. cit.*, p. 139 and H. A. Wolfson, *Crescas’ Critique of Aristotle*, *op. cit.*, p. 197. On the conditions that Aristotle establishes for the place (surrounding the object, equal to it and separate from it) see *Physics*, IV, 4, 210b 32–211a 2.

³⁸ Gianfrancesco Pico, *Examen vanitatis*, *op. cit.*, p. 1187: “omnia quae collocantur corpora, suis congruere locis falsum esse aperiri, et ex supremi coeli circumferentia, et etiam ex terra, cui locus assignatur non superficies, sed punctus imus, cui loci nomen iure non congruit.”

³⁹ H. A. Wolfson, *Crescas’ Critique of Aristotle*, *op. cit.*, pp. 197–199; cf. H. Crescas, *Light of the Lord*, *op. cit.*, pp. 75–76.

⁴⁰ H. A. Wolfson, *Crescas’ Critique of Aristotle*, *op. cit.*, p. 199; cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 76.

⁴¹ C. B. Schmitt, *Gianfrancesco Pico della Mirandola*, *op. cit.*, pp. 144–154.

⁴² See note 33 above.

⁴³ “But incorporeal dimensions mean nothing but empty place capable of receiving corporeal dimensions. We have advisedly used the words ‘empty place’ because it is evident that the true place of a body is the void, equal to the body and filled by the body”, H. A. Wolfson, *Crescas’ Critique of Aristotle*, *op. cit.*, pp. 187–189; cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 73.

⁴⁴ H. A. Wolfson, *Crescas’ Critique of Aristotle*, *op. cit.*, pp. 179–191; H. Crescas, *Light of the Lord*, *op. cit.*, pp. 70–74. In his extensive notes to these pages Wolfson points out the complete correspondence of Pico’s entire text with different passages of Crescas’ First Speculation.

⁴⁵ Gianfrancesco Pico, *Examen vanitatis*, *op. cit.*, p. 1195. Cf. H. A. Wolfson, *Crescas’ Critique of Aristotle*, *op. cit.*, p. 187: “according to them [those who believe in a vacuum] the impenetrability of bodies is due not to dimensions existing apart from matter, but rather to dimensions in so far as they are possessed of matter”; cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 72. This dimension of the void, as a continuous quantity, can be subject to measurement: “quas [dimensiones] explodi miratur cum magni et parvi nomine donentur, et per eius partes queamus illas dimetiri”, Gianfrancesco Pico, *Examen vanitatis*, *op. cit.*, p. 1195, which picks up from Crescas that “the void itself may be described as great and small and may be measured by a part of itself” (H. A. Wolfson, *Crescas’ Critique of Aristotle*, *op. cit.*, p. 189). On the impenetrability of dimensions, see E. Grant, *Much Ado About Nothing: Theories of Space and Vacuum from the Middle Ages to the Scientific Revolution*. Cambridge: Cambridge University Press, 1981, pp. 22–23.

non negat, et aerem descensurum, si terra loco moveretur affirmat, ob gravitatem verius, quam ne vacuum detur. [...] atque ut caetera obstant vacuo, nihil tamen officere, quin orbiculare corpus in eo moveatur, cum in motu circulari, nec terminus a quo, nec terminus ad quem motus tendat, inveniatur, et secundum Aristotelem maxime, qui motum nunquam voluit incepisse, nec impediri ex intermedio quin vacuum extra mundum reperiri queat, immo accersiri vacuum ab iis vel nolentibus, quibus asseritur non inveniri corpus infinitum. Nam si nullum est extra mundum corpus, nec plenum ibi esse convincitur, vacuum potius et seiuncta dimensio. Negat praeterea dimensiones esse corporis extrema.⁴⁶

In the conclusion of chapter 9, Pico quickly points out two other new components of Crescas' criticism of Aristotle: the possibility of a plurality of worlds ("Hebraeus item ille cuius supra fecimus mentionem plures esse potuisse mundos asseverat")⁴⁷ and of an

infinite body: "negat enim corpus infinitum orbiculari figura pollere, quoniam quod non finitur caret extremis et affirmat praeterea omnem figuram posse in orbem moveri"⁴⁸

However, Gianfrancesco Pico did not take notice of a highly significant passage that appears in Crescas' work among the pages he has extracted in the *Examen vanitatis*. It is the passage in the Second Speculation in which Crescas expounds – from the assimilation of the place of a body with its *form* and thus from the *figurative* (or metaphorical) identification made by the rabbis with the form or essence of a thing –⁴⁹ that God (form of the universe inasmuch as He is its creator) is often *metaphorically* designated by them as "the place of the world".⁵⁰ Wolfson linked the passage to the *kabbalah*⁵¹ and Harvey has insisted that "Crescas makes it perfectly clear that he is using a metaphor or an analogy, and definitively does not identify God literally with space or time. [...] For Crescas, this metaphor is 'remarkably apt', but no more than a metaphor".⁵² While Pico's neglect (should he have known the passage) could perhaps mean that he saw a danger in it, this passage, as Harvey has pointed out,

made an impression on Spinoza. However, while Crescas held that God is *metaphorically* identified with infinite space, Spinoza held that *extensio* is literally an attribute of God. Spinoza thus took Crescas' metaphor literally.⁵³

⁴⁶ Gianfrancesco Pico, *Examen vanitatis*, *op. cit.*, p. 1194-1195. Cf. H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*: "Among the later thinkers there is one who proposed to prove the impossibility of a vacuum by maintaining that the medium is a necessary condition in the existence of motion, and this because the medium has in its nature something akin to a *terminus ad quem*. But this is an assertion which has never been demonstrated and never will be, for it may be claimed on the contrary that the movable bodies have a certain amount of weight, differing only *secundum minus et majus*. Accordingly, those bodies which move upward are so moved only by reason of the pressure exerted upon them by bodies of heavier weight, as, e.g., air, when compressed in water, will tend to rise on account of the pressure of the weight of the water, which being heavier, will seek the below. That this is so will appear from the fact that when we make a hollow in the earth, even as far as the centre, it will immediately fill up with water or air, though, whether this is due to the impossibility of a vacuum within the world or to the weight of the air has not so far been demonstrated and never will be", p. 185. "Hence, with the assumption of a vacuum, neither natural nor violent motion would be impossible. Much less does this argument prove the impossibility of a vacuum outside the world, for even if there existed outside the world a vacuum in which there were no distinction of *terminus a quo* and *terminus ad quem*, it would not be impossible for a spherical body to have circular motion. This is self-evident", p. 183. "Furthermore, even if we were to admit that the medium is a necessary condition in the existence of motion, it is still not impossible for a vacuum to exist outside the world", p. 185; cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 72. "That dimensions are the limits of bodies, this, too, will not be admitted by him who affirms the existence of an incorporeal interval", p. 187; cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 73.

⁴⁷ Gianfrancesco Pico, *Examen vanitatis*, *op. cit.*, p. 1208. Cf. H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, p. 217 (Fourth Speculation): "Since the error of his initial premise [first proposition in *Guide*, ii, introduction] is manifest, for it has already been shown before that an infinite magnitude must exist and that outside the world there must exist an infinite plenum or vacuum, it clearly follows that the existence of many worlds is possible"; cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 82. See also W. Z. Harvey, *Physics and Metaphysics in Hasdai Crescas*, *op. cit.*, pp. 8-13, where it is further argued that "the conclusion that there exists an infinite number of worlds is inescapable", p. 11. See also *Or Adonai*, IV, 2, translated by Harvey, *ibid.*, pp. 36-40. On the possibility that Crescas may have been influenced at this point by Nicolas Oresme, see *ibid.*, pp. 23-29. Note that while Pico (with Oresme) believes in the uniqueness of the world ("Credidi equidem semper sensilem hunc mundum unum esse, sed fide credidi non Aristotelis id rationibus mihi persuasi", Gianfrancesco Pico, *Examen vanitatis*, *op. cit.*, p. 1205), even if he accepts

that the plurality of the worlds is possible (because of "Dei potestas infinita", *ibid.*, p. 1207), Crescas points out the impotence of human reason: "Inasmuch as the existence of many worlds is a possibility true and unimpeachable, yet as we are unable by means of mere speculation to ascertain the true nature of what is outside this world, our sages, peace be upon them, have seen fit to warn against searching and inquiring into 'what is above and what is below, what is before and what is behind'", H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, p. 217; cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 82.

⁴⁸ Gianfrancesco Pico, *Examen vanitatis*, *op. cit.*, p. 1208. Cf. H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, p. 213 (Third Speculation): "if a body is conceived to be infinite it has no extremities, and thus it has no figure. There would be some ground for his [Maimonides'] objection if circular motion required a spherical figure, but an object of any figure may have circular motion. By conceiving, therefore, a body devoid of any boundaries, we conceive it also to be devoid of any figure, and so it does not follow that it would have to be finite"; cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 81.

⁴⁹ H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, pp. 199-200: "our rabbis, peace be upon them, applied the term *figuratively* to the form and essence of a thing"; italics are ours. Cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 77.

⁵⁰ H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, p. 201: "Accordingly, since the Blessed One is the form of the entire universe [...], He is *figuratively* called Place, as in their oft-repeated expressions, [...] 'He is the Place of the world'. This last *metaphor* is remarkably apt, for as the dimensions of the void permeate through those of the parts of the world and the fullness thereof, so His glory, blessed be He, is present in all the parts of the world"; italics are ours; cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 77. See also W. Z. Harvey, *Physics and Metaphysics in Hasdai Crescas*, *op. cit.*, pp. 28-29. Harvey notes (p. 29) that Crescas also applies the metaphor to God's relationship to time.

⁵¹ H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, p. 459.

⁵² W. Z. Harvey, *Physics and Metaphysics in Hasdai Crescas*, *op. cit.*, pp. 28-29.

⁵³ *Ibid.*, p. 30. The transformation by Spinoza had already been pointed out by Wolfson; see *Crescas' Critique of Aristotle*, *op. cit.*, p. 123 and *id.*, *The Philosophy of Spinoza*. 2 vols. New

It seems, then, that the moment has come to introduce Giordano Bruno, of whom there is no mention in Harvey's book and whom Carlos Fraenkel mentions in passing, when he echoes the connection established by Jacobi between Bruno and Spinoza,⁵⁴ and then completely forgets about him. However, according to Wolfson, "it is said that in Bruno there is an intimation that extension is one of God's attributes",⁵⁵ and in his book on Crescas he had patiently recorded passages in Bruno's work in which one could recognize a parallel or a connection with others in *Or Adonai* on space and the infinite universe.

2. Giordano Bruno, Gianfrancesco Pico and Crescas

Did Bruno know Crescas' work? Did he at least know the work of the young Pico and through it Crescas' critique of Aristotle? As far as Pico is concerned, it has been noted that Bruno's disparaging mention to Guillaume Cotin – librarian of the Parisian abbey of Saint Victor in December 1585, after Bruno's arrival to Paris, a few weeks earlier, from London, where he had published the six Italian dialogues – according to which, "il meprise Cajétain et Picus Mirandulanus, et toute la philosophie des Jésuites",⁵⁶ designates not Giovanni Pico, as Spampanato retained,⁵⁷ but Gianfrancesco Pico. This is what Eugenio Garin⁵⁸ maintained and what seems highly plausible considering that, despite his great differences with Marsilio Ficino and Giovanni Pico, Bruno seems to have considered the latter a worthy interlocutor.

Bruno seems to have known Gianfrancesco's work and in particular the *Examen vanitatis*, which could have served him as a doxographical source. Thus, it has been noted that the mention in *La cena de le Ceneri* (London 1584) of the precursors of Copernicus in the affirmation of the motion of the Earth (Philolaus, Heraclides, Ecphantus, Nicetas [sic], Plato and Nicholas of Cusa)⁵⁹ may be based on the description in the *Examen vanitatis* (I, 12), although it surely also took into account the mention by Copernicus himself in the dedicatory letter of the *De revolutionibus* to Pope Paul III.⁶⁰ Other passages of the *Examen* have also been pointed out

as a probable source of similar ones in Bruno,⁶¹ as for example the mention of Philoponus' concept of space and the distinction between privative infinity ("qua infinitum pro carentia perfectionis capitur") and positive infinity ("qua id supereminentiam virtutis et potestatis indicat"),⁶² but they have a much more probable source in the very reading of Philoponus' Commentary⁶³ and Nicholas of Cusa respectively.⁶⁴

In any case, could Bruno have gained access to Crescas' criticism – whose name he never mentions – of Aristotle through the *Examen vanitatis*, which he surely knew? In his book on Crescas, Wolfson painstakingly recorded many parallels between the text of *Or Adonai* and passages of Bruno, both from the Italian Dialogues (*De l'infinito universo e mondi* and *De la causa, principio et uno*) and from the Latin poem *De immenso et innumerabilibus*. But he seems to lean, rather than towards Pico's mediation, towards that of "some unknown Jewish intermediary".⁶⁵ Although each of the multiple coincidences could have arrived independently to the mind of any critical reader of Aristotle, Wolfson argues that "the accumulation of all of those arguments creates the impression that there must have been some connecting link between Crescas and Bruno".⁶⁶

More recently, David Harari has postulated Leone Ebreo and his work *De coeli harmonia* – a lost work whose content we do not know – as the source that provided Bruno with the information on Crescas' criticism of Aristotle and therefore served him for the elaboration of his own doctrine.⁶⁷ We agree with

⁶¹ L. Brotto, "Giovanni Francesco Pico della Mirandola", *op. cit.*, p. 1486.

⁶² Gianfrancesco Pico, *Examen vanitatis*, *op. cit.*, pp. 1180-1181.

⁶³ Cf. G. Bruno, *De immenso et innumerabilibus*, I, 8, in id., *Opera latine conscripta*. Naples/Florence: Morano/Le Monnier. Vol. I, 1, p. 231; see also M. Á. Granada, "Giordano Bruno's Concept of Space: Cosmological and Theological Aspects", in F. A. Bakker, D. Bellis and C. R. Palmerino (eds.), *Space, Imagination and the Cosmos from Antiquity to the Early Modern Period*. Cham (Switzerland): Springer, 2019, pp. 160-161.

⁶⁴ Nicholas of Cusa, *On Learned Ignorance. A Translation and an Appraisal of 'De docta ignorantia'*. Trans. J. Hopkins. Minneapolis: The Arthur J. Banning Press, 1981, II, 1, 97, p. 90. Cf. P. R. Blum, *Aristoteles bei Giordano Bruno. Studien zur philosophischen Rezeption*. Munich: Fink Verlag, 1980, pp. 41-42 and on infinity as absolute perfection D. Knox, "Libro II. La perfezione dell'universo", in M. Á. Granada and D. Tessicini (eds.), *Giordano Bruno, 'De immenso'. Letture critiche*. Pisa/Rome: Fabrizio Serra, 2020, pp. 71-102.

⁶⁵ H. A. Wolfson, *Crescas' Critique of Aristotle*, *op. cit.*, p. 36. Cf. *ibid.*, p. 35: "If it was possible for Giovanni Francesco Pico della Mirandola to become acquainted with some of Crescas' criticisms of Aristotle through some unknown Jewish scholar, we have reason to believe that it is not a mere fortuitous coincidence that many of Giordano Bruno's strictures on Aristotle have a reminiscent ring of similar strictures by Crescas. The name of Crescas is not mentioned by Bruno, but still one cannot help feeling that there must be some connection between them".

⁶⁶ *Ibid.*, p. 35.

⁶⁷ D. Harari, "Who was the Learned Jew that Made Known Hasdai Crescas' *The Light of the Lord* to Gianfrancesco Pico della Mirandola?", *Jerusalem Studies in Jewish Thought*, 14 (1998), p. 269 (Hebrew). Harari's proposal goes far beyond pointing to Leone Ebreo as Bruno's source in his knowledge of Crescas, since he goes as far as to argue, without sufficient support, that *De gli eroici furori* derives directly from the lost fourth book of Ebreo's *Dialoghi d'amore* (1535), that the *Candelai* is constructed from Hebrew and Aramaic materials that had to reach Bruno through an intermediary, and that even the *Spaccio de la bestia trionfante* derives from Leone

York: Meridian Books, 1958, vol. I, pp. 222-223. It has recently been studied by C. Fraenkel, "Hasdai Crescas on God as the Place of the World and Spinoza's Notion of God as Res Extensa", *Aleph*, 9 (2001), pp. 77-111.

⁵⁴ C. Fraenkel, "Hasdai Crescas on God as the Place of the World", *op. cit.*, p. 80 and note 9.

⁵⁵ H. A. Wolfson, *Spinoza*, *op. cit.*, vol. I, p. 223.

⁵⁶ Parisian Documents, II, in Vincenzo Spampanato, *Vita di Giordano Bruno con documenti editi e inediti*. Messina: Principato, 1921, p. 652.

⁵⁷ *Ibid.*, p. 311.

⁵⁸ E. Garin, *Storia della filosofia italiana*. Vol. II. Turin: Einaudi, 1966, p. 672. See also, L. Brotto, "Giovanni Francesco Pico della Mirandola", in M. Ciliberto (ed.), *Parole, concetti, immagini*. Pisa/Florence: Edizioni della Normale/Istituto Nazionale di Studi sul Rinascimento, 2014, p. 1485a.

⁵⁹ G. Bruno, *La cena de las Cenizas*. Trans. M. Á. Granada, Barcelona, 2015, p. 116 and note.

⁶⁰ Gianfrancesco Pico, *Examen vanitatis*, *op. cit.*, p. 773 and Copernicus, *De revolutionibus orbium coelestium*. Nuremberg, 1543, p. iiiif. The coincidence with Pico's passage had already been pointed out by D. Tessicini, *I dintorni dell'infinito: Giordano Bruno e l'astronomia del Cinquecento*. Pisa/Rome: Fabrizio Serra, 2007, p. 48.

Francesco Malaguti that “despite all these analogies between Bruno and Crescas, we cannot demonstrate with certainty that the Nolan knew the doctrines exposed in *Or Adonai*”.⁶⁸ Even more recently, Mauro Zonta has affirmed, with evident exaggeration, that “la dipendenza di molte delle argomentazioni di Giordano Bruno contro Aristotele e l’aristotelismo, specialmente in relazione a temi quali il concetto di spazio e di tempo o l’esistenza dell’infinito, dalle consimili argomentazioni riportate nella principale opera del filosofo ebreo spagnolo Hasdai Crescas [...] è nota da molto tempo”.⁶⁹ Zonta, however, does not pronounce on the plausibility of the identification proposed by Harari and has presented the correspondence between Bruno’s and Crescas’ arguments on the plurality of worlds, already pointed out by Harvey,⁷⁰ with remarkable detail (pp. 149-153) to show “le analogie sussistenti tra di esse e quelle di Bruno”, while recognizing that Harvey has “individua[to] le fonti nella scolastica latina”.⁷¹

A close examination, however, of the connections and parallels recorded by Wolfson and Zonta reveals that Bruno was perfectly able to formulate his positions from the text of Aristotle himself and from the late medieval and Renaissance Latin tradition.⁷² However, from this examination some highly interesting and disturbing issues emerge that raise doubts and questions which are difficult to answer.

Thus, when Crescas argues in *Or Adonai* against the impossibility of an actually infinite body (i. e. an infinite universe), he points out, in line with the implicit

assumption that this is the main issue: “as an error in first principles leads to an error in what follows on the first principles, the implication of this proposition has led him [Aristotle] to conclude that there are not any other worlds”.⁷³ In his note to this passage Wolfson affirms that “this statement [...] is also quoted by Bruno”.⁷⁴ Indeed, it is; but this coincidence may be due to the fact that Bruno begins the discussion with Aristotle from the passage in *De caelo*, I, 5 (which was an ‘auctoritas’ from the Middle Ages)⁷⁵ that initiates the refutation of the possibility of an infinite universe:

We must go on to consider the questions which remain. First, is there an infinite body [...] or is this an impossibility? The decision of this question, either way, is not unimportant, but rather all important, to our search for the truth. [...] since the least initial deviation from the truth is multiplied later a thousandfold.⁷⁶

Bruno begins his refutation of Aristotle’s reasons against the infinite universe with the following words, which amplify the Aristotelian text:

Io referirò le sentenze d’Aristotele per ordine, e voi direte circa quelle ciò che vi occorre. “È da considerare”, dice egli, “se si trova corpo infinito, come alcuni filosofo dicono, o pur questo sia una cosa impossibile; et appresso è da vedere se sia uno over più mondi. La risoluzione de le quali questioni è importantissima: perché l’una e l’altra parte della contradizione son di tanto momento, che son principio di due sorte di filosofare molto diverso e contrario [...] perché quantumque poco di trasgressione che si fa nel principio viene per diecemila volte a farsi maggiore nel progresso.”⁷⁷

It will be noted that Bruno extends Aristotle’s text by adding that, once solved the question of the possibility or impossibility of an infinite universe, it follows whether there can be and there is in fact a plurality of worlds. This extension of the text and the following implication regarding the plurality of worlds had already been made by Crescas in the quoted passage: “the implication of this proposition has led him to conclude that there are not any other worlds”. Is this simply a coincidence, highly possible because both have recognized the implication of the issues and seen that Aristotle in *De caelo*, I, 8 and 9 refutes the possibility of there being more than one world from the refutation of the infinite universe in *De caelo*, I, 5-7, or did Bruno know Crescas’ work from a source different from the *Examen vanitatis* of the young Pico?

Ebreo. From Harari’s analysis it seems to follow ultimately that to Bruno arrived, it is not said how, materials from Leone Ebreo which he subsequently published as his own. See Harari’s article cited note 11 above.

⁶⁸ F. Malaguti, “Giordano Bruno and Jewish Thought: Reception and Reinterpretation”, *International Journal of Theology, Philosophy and Science*, 8 (2021), p. 80.

⁶⁹ M. Zonta, “Due note sulle fonti ebraiche di Giovanni Pico e Giordano Bruno”, *Rinascimento*, 40 (2000), p. 147; our italics. See also the shorter English edition: M. Zonta, “The Influence of Hasdai Crescas’s Philosophy on Some Aspects of Sixteenth-Century Philosophy and Science”, in J. Helm and A. Winkelmann (eds.), *Religious Confessions and the Sciences in the Sixteenth Century*. Leiden/Boston/Köln, 2001, pp. 71-78.

⁷⁰ Cf. note 47 above.

⁷¹ M. Zonta, “Due note sulle fonti ebraiche”, *op. cit.*, p. 148. If Harvey had referred to the possible influence of Oresme on Crescas (cf. *Physics and Metaphysics*, *op. cit.*, pp. 23-29), an influence already noted earlier by P. Duhem (*Le système du monde*. Vol. V. Paris: Hermann, 1917, pp. 230-232) and S. Pines (“Scholasticism after Thomas Aquinas and the Teachings of Hasdai Crescas and his Predecessors”, in id., *Collected Works*. Vol. V. Jerusalem: The Magnes Press, 1997, pp. 489-589), more recently Ari Ackermann has plausibly argued for the very likely influence of Thomas Aquinas. See A. Ackermann, “Hasdai Crescas and Scholastic Philosophers on the Possible Existence of Multiple Simultaneous Worlds”, *Aleph*, 17 (2017), pp. 139-154. See also the contributions by A. Ackermann, J. T. Robinson and specially T. M. Rudavsky in D. H. Frank and O. Leaman (eds.), *The Cambridge Companion to Medieval Jewish Philosophy*. Cambridge, 2003, where the influence of Latin scholasticism on the Jewish philosophers of the time and specially on Crescas is recorded.

⁷² F. Malaguti, “Giordano Bruno and Jewish Thought”, *op. cit.*, p. 79, has noted the case of Marcellus Palingenius Stellatus and his *Zodiacus Vitae* (Basilea, 1537), a work known and evaluated very critically by Bruno, as an intermediate link in the doctrine that “God has no limitations in the process of creation”; on Palingenius and Bruno see M. Á. Granada, *Filosofía y religión en el Renacimiento: de Gemisto Pletón a Galileo*. Sevilla, 2021, pp. 316-320, 327-337.

⁷³ H. A. Wolfson, *Crescas’ Critique of Aristotle*, *op. cit.*, pp. 215-217; cf. H. Crescas, *Light of the Lord*, *op. cit.*, pp. 81-82. The reference to Bruno’s *De l’infinito, universo e mondi* given by Wolfson is erroneous.

⁷⁴ H. A. Wolfson, *Crescas’ Critique of Aristotle*, *op. cit.*, p. 472.

⁷⁵ Cf. Jacqueline Hamesse, *Les Auctoritates Aristotelis: Un florilège médiéval. Étude historique et édition critique*. Louvain/Paris: Publications Universitaires/ Béatrice Nauwelaerts, 1974, p. 161 (n° 19): “Parvus error in principio, maximus erit in fine”.

⁷⁶ Aristotle, *De caelo*, I, 5, 271b1-10, in id., *The Complete Works*, *op. cit.*, vol. I, p. 452.

⁷⁷ G. Bruno, *De l’infinito, universo e mondi*, in id., *Œuvres complètes*. Vol. IV. Ed. G. Aquilecchia, trans. J.-P. Cavallé. Paris, 1995, pp. 119-121.

Crescas states that “since according to the view of those who maintain the impossibility of an infinite body, there is no body outside the world, there must necessarily be there a void. [...] But this incorporeal magnitude outside the world cannot have a limit”,⁷⁸ and Wolfson adduces Bruno’s parallel passage in *De l’infinito*: “Se si risponde che è nulla [outside this world], questo dirò io esser vacuo, essere inane: e tal vacuo e tale inane, che non ha modo, né termine alcuno oltiore.”⁷⁹ The parallelism is evident, but it may also be a coincidence, for Bruno knew (and mentions it in *De l’infinito*, p. 115) the Stoic doctrine of the infinite void outside the one world. Likewise, Crescas says that the Aristotelian concept of place as the inner surface of the surrounding body condemns the one world to have no place or at most an accidental place.⁸⁰ Wolfson refers the reader to *De l’infinito*, where Bruno makes the same consideration: “mi par cosa ridicola il dire che estra il cielo sia nulla, e che il cielo sia in se stesso, e locato per accidente” (p. 67) and to the later *De immenso*,⁸¹ where Bruno presents the different solutions to the Aristotelian difficulty found by Greek, Islamic and Christian Peripatetics. Curiously, these are almost the same authors whose solutions Wolfson presents in his annotation to the passage in Crescas (pp. 432-441), but which Bruno may have taken from a contemporary scholastic author (Benedictus Perera), whom he does not mention, but whose work he knew and very probably criticized in *De immenso*.⁸²

Crescas rejects Aristotle’s argument against the possibility of an infinite body (*De caelo*, I, 5, 271b 28-272a 7) from the impossibility of its circular motion:

As for the arguments [to prove the impossibility of an infinite body] from circular motion, they are likewise inconclusive, being again based upon the analogy of a [finite] body. His opponent may, therefore, argue that while indeed there is an infinite body, it is incapable of circular motion for those very reasons given by Aristotle.⁸³

Similarly, as Wolfson also observed in his note to this passage, Bruno states after quoting Aristotle’s passage:

Questa ragione è buona: ma non è a proposito contra l’intenzione de gli avversarii: perché giamai s’è ritrovato sì rozzo, e d’ingegno sì grosso, che abbia posto il mondo infinito e magnitudine infinita, e quella mobile. E mostra lui medesimo essersi dimenticato di quel che riferisce nella sua *Fisica*: che quei che hanno posto uno ente

et uno principio infinito, hanno posto similmente immobile.⁸⁴

Then Bruno adds: “Or vedete se de quante ragioni produce questo mendico [Aristotle], se ne ritrovo pur una che arguente contra l’intenzione di quei che dicono uno, infinito, immobile, infigurato, spaciosissimo continente de innumerabili mobili che son gli mondi”.⁸⁵ And Crescas also points out, a few pages after the last quoted passage, that an infinite body lacks a figure, since Aristotle’s argument “is based upon the proposition which states that an infinite body moving in a circle must necessarily have a spherical figure. This, however, is untrue for if a body is conceived to be infinite, it has no extremities, and thus it has no figure”,⁸⁶ to which he adds shortly after that “an infinite, having no extremities, likewise has no centre”.⁸⁷ Here again the obvious coincidence with Crescas may not go beyond a very interesting overlap, since Bruno may have reached this conclusion from his critical reading of Aristotle and, as regards the lack of a figure in the infinite body, from the famous definition of God, which he also applies to the infinite universe, as an “infinite sphere whose center is everywhere and the circumference nowhere”.⁸⁸ The eventual coincidence would rest on the unattested reading by Bruno of Crescas’ text, since these motifs are absent from the references to Crescas in Pico’s *Examen vanitatis*, and requires that Bruno necessarily accessed a Latin translation of *Or Adonai*, of which there is no indication, given the null foundation of Harari’s proposal.

Wolfson also points out that Crescas and Bruno agree in distinguishing an intensive and an extensive infinite power or force.⁸⁹ However, apart from the fact that Bruno may have taken the distinction from the Latin tradition, where it is widely documented,⁹⁰ Crescas rejects the possibility that a power of infinite intensity can move, since that movement would be timeless, that is, instantaneous,⁹¹ while Bruno, rely-

⁷⁸ H. A. Wolfson, *Crescas’ Critique of Aristotle*, op. cit., p. 189; cf. H. Crescas, *Light of the Lord*, op. cit., p. 73.

⁷⁹ G. Bruno, *De l’infinito, universo e mondi*, op. cit., p. 67.

⁸⁰ H. A. Wolfson, *Crescas’ Critique of Aristotle*, op. cit., p. 197; cf. H. Crescas, *Light of the Lord*, op. cit., p. 75.

⁸¹ G. Bruno, *De immenso*, I, 6, op. cit., vol. I, 1, pp. 221-225.

⁸² See B. Perera, *De communibus omnium rerum naturalium principiis et affectionibus*. Paris: Sonnius, 1579, XI, 8, pp. 625-628. See also M. Á. Granada, “Libro I. La relazione Dio / mondo e la necessità dell’universo infinito”, in id. and D. Tessicini (eds.), *Giordano Bruno, De immenso. Letture critiche*. Pisa/Rome: Fabrizio Serra, 2020, pp. 58, 60, 66-69.

⁸³ H. A. Wolfson, *Crescas’ Critique of Aristotle*, op. cit., p. 205; cf. H. Crescas, *Light of the Lord*, op. cit., p. 79.

⁸⁴ G. Bruno, *Del infinito*, op. cit., p. 123. However, Crescas affirms that “there is nothing that proves conclusively the impossibility of circular motion in an infinite body. Quite the contrary, our discussion has made it clear that motion is possible in an infinite body”, H. A. Wolfson, *Crescas’ Critique of Aristotle*, op. cit., p. 213; H. Crescas, *Light of the Lord*, op. cit., p. 81.

⁸⁵ G. Bruno, *De l’infinito*, op. cit., p. 125.

⁸⁶ H. A. Wolfson, *Crescas’ Critique of Aristotle*, op. cit., p. 213; cf. H. Crescas, *Light of the Lord*, op. cit., p. 81.

⁸⁷ H. A. Wolfson, *Crescas’ Critique of Aristotle*, op. cit., p. 215; cf. H. Crescas, *Light of the Lord*, op. cit., p. 81.

⁸⁸ Ps. Hermes Trismegistus, *Liber viginti quattuor philosophorum*, def. 2: “Deus est sphaera infinita, cuius centrum est ubique, circumferentia nusquam.” On the fortune of this definition in the medieval and Renaissance tradition up to Cusa, see Dietrich Mahnke, *Unendliche Sphäre und Allmittelpunkt*. Halle: Niemeyer, 1937.

⁸⁹ H. A. Wolfson, *Crescas’ Critique of Aristotle*, op. cit., p. 273: “it is evident that the term infinite may be used in a twofold respect, with regard to intensity and with regard to time”; cf. H. Crescas, *Light of the Lord*, op. cit., pp. 87-88. In his note to this passage, Wolfson (on p. 613) refers to Bruno, *Infinito*, op. cit., pp. 95-96.

⁹⁰ See M. Á. Granada, “‘Blasphemia vero est facere Deum alium a Deo’. La polemica di Bruno con l’aristotelismo a proposito della potenza di Dio”, in E. Canone (ed.), *Letture bruniane I. Il del Lessico Intellettuale Europeo 1996-1997*. Pisa/Rome: Istituti Editoriali e Poligrafici Internazionali, 2002, pp. 166-178.

⁹¹ H. A. Wolfson, *Crescas’ Critique of Aristotle*, op. cit., p. 271: “the conclusion that there would be motion without time does not follow, inasmuch as every motion has that original

ing on Cusa and on the doctrine of the *coincidentia oppositorum*, affirms that the divine intensive power moves the infinite universe with a movement of infinite intensity in the instant, since such movement coincides with rest.⁹² Similarly, if both agree in affirming the plurality of worlds, Bruno starts from the criticism of Aristotle and the Latin tradition that (especially after the condemnation of 1277 but also before) affirmed the possibility, *de potentia absoluta*, that God had created more than one world, although his free *potentia ordinata* had established the unique world of Aristotle.⁹³ With Crescas, Bruno not only affirms the possibility of the plurality of worlds, but also their necessary infinitude, which in Crescas is an “inescapable” conclusion, according to Harvey, but does not appear in *Or Adonai* with the same emphasis that we find in Bruno.⁹⁴ In any case, God’s creation of the plurality of worlds is, in Bruno, a necessary effect of the divine essence, in which necessity and freedom are one and the same thing and where the production in accordance with all His infinite power entails the infinitude of the universe and of the worlds contained in it,⁹⁵ while in Crescas the creation of the universe and of its worlds (finite or infinite in number) is a free act of the divine will: “the coming into existence of the world was by will and in the manner of beneficence and grace”.⁹⁶ In his voluntarism, Crescas differs from Bruno and also from Spinoza, who give priority to God’s potency, to which they subordinate both His understanding and His will, viewed as two different ways of conceiving God’s power.

It cannot be forgotten that only Bruno’s Copernicanism, with the attribution to the Earth of the daily motion, opens the physical possibility of the infinite universe, with the consequent identification, by Bruno, of the stars as so many suns that are centers of respective planetary systems, which constitute the innumerable worlds (in Bruno ‘synodi ex mundis’) separated by vast extensions of empty space or better ether.⁹⁷ Inevitably, Crescas cannot

think the plurality of worlds except from geocentrism and recognize that the other ‘worlds’ repeat the structure of ours (with the central earth and a peripheral sphere of fixed stars in daily motion around it), so that “a causa della grande distanza che vi è tra i mondi, noi potremmo non vedere nulla di quelle stelle [in the other worlds]”.⁹⁸

However, if the correspondences pointed out by Zonta are present in the late medieval and Renaissance discussion on the infinite divine production by virtue of the infinite power and goodness of God, one of the arguments adduced by Crescas against the plurality of worlds certainly shows a striking correspondence with Bruno. Its presence, however, in intermediate Latin sources is unknown to me. This argument, taken from Gersonides and reproduced by Harvey, states:

Inasmuch as a plurality of individuals is found only with regard to individuals that are generated and corrupted, like animals and plants, it would seem that their plurality is only for the purpose of the preservation of the species, and thus there is no plurality with regard to incorruptible individuals. It follows that there is no plurality with regard to the world, it having been proved to be incorruptible.⁹⁹

This argument appears in Bruno’s *De l’infinito*, p. 235, in the following terms:

Da uno non può provenire pluralità d’individui, se non per tal atto per cui la natura si moltiplica per divisione della materia; e questo non è altro che di generazione. Questo dice Aristotele con tutti li Peripatetici. Non si fa multitudini d’individui sotto una specie, se non per l’atto della generazione. Ma quelli che dicono più mondi di medesima materia e forma in specie, non dicono che l’uno si converte nell’altro, né si genera dall’altro.

Bruno replies to this argument with the following words:

questo non è universalmente vero: perché da una massa per opra del solo efficiente si producono molti e diversi vasi di varie forme e figuri innumerabili. Lascio che, se fia l’interito e la rinovazion di qualche mondo, la produzione de gli animali, tanto perfetti quanto imperfetti senza atto di generazione nel principio viene effettuata dalla forza e virtù della natura.¹⁰⁰

Crescas’ reply is very different: that argument “based on induction, does not establish the truth. For proof cannot be brought from an analogical syllogism”.¹⁰¹

time from which it is never free”; cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 87.

⁹² G. Bruno, *De l’infinito*, *op. cit.*, p. 103: “nelle cose è da contemplare (se così volete) doi principi attivi del moto: l’uno finito, secondo la ragione del finito soggetto, e questo muove in tempo; l’altro infinito, secondo la ragione dell’anima del mondo, ovvero della divinità, [...] e questo muove in istante. [...] Tanto che in conclusione questi corpi essere mossi da virtù infinita, è medesimo che non esser mossi; per che muovere in istante e non muovere, è tutto medesimo et uno”. See also M. Á. Granada, “Blasphemia vero est facere Deum alium a Deo”, *op. cit.*, pp. 178-188.

⁹³ See, as a mere example, L. Bianchi and E. Randi, *Le verità dissonanti: Aristotele alla fine del medioevo*. Rome/Bari: Laterza, 1990, pp. 61-67.

⁹⁴ See note 47 above and H. A. Wolfson, *Crescas’ Critique of Aristotle*, *op. cit.*, p. 117.

⁹⁵ G. Bruno, *De l’infinito*, *op. cit.*, pp. 83-89 and 109: “Se dunque lui è operatore de l’universo, certo è operatore infinito, e riguarda effetto infinito [...] come la potenza attiva è infinita, così (per necessaria conseguenza) il soggetto di tal potenza è infinito.” Cf. G. Bruno, *De immenso*, I, 11, vol. I, 1, pp. 241-244 and M. Á. Granada, “Libro I. La relazione Dio / mondo e la necessità dell’universo infinito”, *op. cit.*, pp. 59-64.

⁹⁶ H. Crescas, *Or Adonai*, IV, Investigation 2, quoted in W. Z. Harvey, *Physics and Metaphysics in Hasdai Crescas*, *op. cit.*, p. 36; M. Zonta, “Due note sulle fonti ebraiche”, *op. cit.*, p. 151.

⁹⁷ See Miguel Ángel Granada, “Synodi ex mundis”, in E. Canone and G. Ernst (eds.), *Enciclopedia Bruniana e Campanelliana*. Vol. II. Pisa/Rome: Fabrizio Serra, 2010, cols. 142-154.

⁹⁸ Quoted by M. Zonta, “Due note sulle fonti ebraiche”, *op. cit.*, p. 152.

⁹⁹ W. Z. Harvey, *Physics and Metaphysics in Hasdai Crescas*, *op. cit.*, p. 37; M. Zonta, “Due note sulle fonti ebraiche”, *op. cit.*, p. 152. See H. Crescas, *Light of the Lord*, *op. cit.*, IV, 2, p. 335.

¹⁰⁰ G. Bruno, *De l’infinito*, *op. cit.*, p. 367. On the spontaneous generation of animals after periodical catastrophes (floods, for example), see M. Á. Granada, “Conflagración en el Renacimiento”, *Bruniana & Campanelliana*, 26 (2020), pp. 140-144.

¹⁰¹ W. Z. Harvey, *Physics and Metaphysics in Hasdai Crescas*, *op. cit.*, p. 39; cf. H. Crescas, *Light of the Lord*, *op. cit.*, p. 334.

However, the coincidence in the presentation of the argument of the opposing party, so specific, is striking and still leaves open the possibility of an as yet unknown intermediate source.

3. Bruno on Space and Time as Attributes of God

As noted above, Spinoza – who knew Crescas' work in the original Hebrew –¹⁰² took literally what in Crescas was a simple metaphor and made space (as extension-matter) an attribute of God, conceived no longer as a transitive (transcendent or 'separate'), but as an immanent cause of *natura naturata*, with the result that infinite nature is an expression of God. Bruno made the same transformation in the conception of God, taking also literally what in Crescas was a metaphor about God and developing in a different way some initial coincidences in the critique of Aristotle. These coincidences, rather than resulting from Bruno's knowledge of Crescas' critique, show a similar development from their common insertion in a philosophical tradition.

In the case of time, and contrary to what happens with space and matter, Bruno only dwells on it in the Italian dialogues to note that the infinite universe is also eternal, since the infinite divine power unfolds necessarily and freely in an infinite and eternal universe: "dopo aver detto l'universo dover essere infinito per la capacità et attitudine del spacio infinito, e per la possibilità e convenienza dell'essere di innumerabili mondi come questo: resta ora parlarlo e dalle circostanze dell' efficiente che deve averlo prodotto tale, o (per parlar meglio) *produrlo sempre tale*".¹⁰³

The moment to address the question of time arrived in 1586, when during his second stay in Paris Bruno wrote the *Centum et viginti articuli de natura et mundo adversus Peripateticos*, intended to serve as material for a *disputatio* at the College of Cambrai that took place at the end of May.¹⁰⁴ There, among the articles that refute Aristotle's *Physics*, Bruno includes three "On time" (articles 38-40).¹⁰⁵ The printed edition contained only the text of the articles or theses. In 1588, however, during his stay in Germany, Bruno published in Wittenberg the Parisian articles, adding explanations (*rationes*) for the articles related to the *Physics* and therefore for the three articles on time.¹⁰⁶

The first article (38) assumes, awaiting a modification that occurs in the following article, that "time is a measure of motion", adding however that the presumed first motion established as a measure of time "is not found in the heavens, but in the heavenly bodies", more specifically: "it has no other subject than the Earth". This assertion could not be in Crescas, because it assumes the Copernican doctrine of the daily motion of the Earth (whereby the daily motion of the first heaven is mere appearance), a doctrine that Bruno adopts and develops with the infinite expansion of the universe, which accordingly becomes motionless. The consequence, drawn by Bruno in the Explanation, is that there is no universal physical time by virtue of the daily motion of the whole, but that this presumed universal time is in reality a particular time, of the Earth, so that "tot sane erunt in universo tempora, quot sunt et astra".¹⁰⁷ Each world (i.e., each star) has, by virtue of its own motion, its own time, with which it measures all other motions.

The second article (39) affirms, by virtue of the reciprocal measure of movement and time, that "motion is rather the measure of time than the opposite". The multiple determination of times by the multiple and different motions of the worlds, allows Bruno to relativize physical times and make them mere concretions of "duration" (*duratio*), which is the true universal time, also called "eternity",¹⁰⁸ completely independent of motion and prior to it. In this way, time manifests itself as something parallel to absolute and infinite space.¹⁰⁹ space is motionless while duration is a continuous and uniform 'present', in which all existents (both those considered eternal and those existing during a greater or lesser age) are in a 'flow' of different intensity.¹¹⁰

The Medieval Concept of Time: Studies on the Scholastic Debate and its Reception in Early Modern Philosophy. Leiden: Brill, 2001, pp. 477-505.

¹⁰⁷ G. Bruno, *Camoeracensis Acrotismus*, *op. cit.*, p. 144; id., *Acrotismo Cameracense*, *op. cit.*, p. 103.

¹⁰⁸ G. Bruno, *Camoeracensis Acrotismus*, *op. cit.*, p. 147: "tempus universale aeternitatem dicimus"; id., *Acrotismo Cameracense*, *op. cit.*, p. 105.

¹⁰⁹ Cf. P. R. Blum, *Aristoteles bei Giordano Bruno*, *op. cit.*, p. 50: "Parallelisierung der strukturell gleichen Begriffe Raum und Zeit (bzw. Dauer)".

¹¹⁰ Cf. G. Bruno, *De immenso*, I, 12, *op. cit.*, vol. I, 1, p. 244: "Praeteritum, praesens, quidquid capis, atque futurum, / Ante Deum praesens unum est unumque perenne"; id., *Camoeracensis Acrotismus*, *op. cit.*, pp. 146-147: "Sicut igitur locus unus, infinitum unum, infinitum spacium commune pro universo infinito esse oportet, ita unum tempus commune, una duratio, nec finem neque principium ullum recognoscens. Et veluti sub uno infinito spacio, continuo, communi infinita particularium loca, propriaque spatia intelliguntur, quae singulis quibusque quadrant: ita sub communi una omnium duratione, diversis diversae durationes atque tempora appropriantur. Different autem duratio atque spatium, quia undique, in generali, et particulari, spatium immobile manens, tempus vero velocissime fluens intelligitur in iis, quae citissime moventur, tardius in iis, quae aegrius mutantur, minime in iis, quae nullam suscipiunt alterationem. Sub una igitur duratione alia dicuntur aeterna, alia simpliciter temporalia, et horum alia maioris, alia minoris aetatis." Note, however, that while Crescas accepts the existence of separate intelligences (the unmoved movers of the celestial spheres), eternal *a parte post*, Bruno rejects their existence, interpreting the intelligences as internal to the soul of the infinite worlds or stars (the true angels or ministers of the Most High) and therefore the principle of their movement.

¹⁰² Spinoza mentions and cites him in Letter 12 to Lodowijk Meyer; see B. Spinoza, *Opera*. Ed. C. Gebhardt. 4 vols. Heidelberg: Winter, 1972, vol. IV, pp. 61-62.

¹⁰³ G. Bruno, *De l'infinito*, *op. cit.*, p. 83; italics are ours; see M. Á. Granada, "Giordano Bruno y la eternidad del mundo", *En-doxxa*, 31 (2013), pp. 349-372.

¹⁰⁴ The *Figuratio aristotelici physici auditus*, printed in 1586 and the *Libri physicorum Aristotelis explanati*, which remained in manuscript, date back to this time.

¹⁰⁵ See G. Bruno, *Centum viginti articuli sulla natura e sull'universo contro i Peripatetici / Centum et viginti articuli de natura et mundo adversus Peripateticos*. Ed. E. Canone. Pisa/Rome: Fabrizio Serra, 2007, pp. 16-17.

¹⁰⁶ G. Bruno, *Camoeracensis Acrotismus seu rationes articulorum physicorum adversus Peripateticos Parisiis propositorum*, Wittenberg, 1588, in id., *Opera latine conscripta*, *op. cit.*, vol. I, 1, pp. 53-190 (: 143-150 on time); id., *Acrotismo Cameracense: Le spiegazioni degli articoli di fisica contro i Peripatetici*. Trans. B. Amato, Pisa/Rome: Fabrizio Serra, 2019 (: 102-107). For an analysis of Bruno's concept of time as expounded in these articles, see M. Á. Granada, "The Concept of Time in Giordano Bruno: Cosmic Times and Eternity", in P. Porro (ed.),

Finally, article 40 states, as Crescas had already done, that “certainly, if there were no movement or mutation, nothing would be called temporal, [but] one and identical would be the time of all things, the one and identical duration, which is called eternity”.¹¹¹ Just as Crescas had introduced rest into the definition of time,¹¹² so does Bruno: “as far as rest is concerned, we also say that it is measured by motion and time”.¹¹³

As regards time and the distinction between time and duration or eternity, Bruno certainly coincides with Crescas, but far from this showing a dependence on the Jewish philosopher, through an unknown intermediary, the striking coincidence – from which he only departs in what Copernicanism implies with respect to universal motion and the consequent measurement of physical time – is sufficiently explained by their common insertion in the Neoplatonic tradition that conceives time as duration. Crescas attributes *duratio* to God *metaphorically*, but Bruno (although he makes no statement in this respect) seems to mean the concept *literally and really*, as it happens with space and with the matter that fills it. While in the case of space the maximum coincides with the minimum, in the case of ‘duration’ the totality of time coincides with the instant. This is because infinity, according to Bruno, has properly no parts, unless an arbitrary or conventional point of reference is introduced, according to which the three-dimensionality of space and the unidirectionality of time are organized.

Accordingly, *duratio/aeternitas* (although it is, like infinite space, a continuous quantity)¹¹⁴ can only be a ‘flow’ once the point of reference is established with the movement. Moreover, in *eternity* everything is given.¹¹⁵ Only for us, placed (thanks to movement) in the flow of time, is there a future. From the perspective of infinite duration everything has already happened, because absolute unity is there, without spatial or temporal distinctions, and with the modes of the substance complicated and indistinct.

Bruno defines infinite space in *De immenso*, with reference to Philoponus, as

quantitas quaedam continua physica triplici dimensione constans, in qua corporum magnitudo capiatur, natura ante omnia corpora, citra omnia corpora consistens, indifferenter omnia recipiens, citra actionis passionis conditiones, immiscibile, impenetrabile, non formabile, illocabile, extra et omnia corpora comprehendens, et incomprehensibiliter intus omnia continens.¹¹⁶

According to Edward Grant, “the consequences of Bruno’s description of space and the properties he assigned it lead inevitably to an infinite space that is coeternal with but wholly independent of God [...]. It does seem that the space God occupied was not of His own making”.¹¹⁷ Shortly before, he states that “although God’s powers and nature were of considerable concern to Bruno, he had virtually no interest in the relationship between the divine power and space”¹¹⁸ and adds:

Bruno’s thoughts on this [...] must be inferred from general cosmological concepts and statements about the deity. Let us recall that for Bruno God is not prior to the universe but coeternal with it. Thus, form and matter, which constitute the substance of the world, are coeternal with God even though they emanate from Him directly and coequally. As a basic entity in the universe, space would also seem to be eternal and to bear some relationship to God. On these issues, however, Bruno was silent.¹¹⁹

For our part, we believe that passages from Bruno’s Latin works not examined by Grant as well as others in the Italian dialogue *De la causa, principio et uno*, allow to affirm that, far from remaining silent and affirming the independence of space with respect to God, Bruno has postulated a rigorous ontological monism in which space results, literally, an attribute or property of God.¹²⁰ Thus, a later passage in *De immenso*, built on the spatial application of the biblical terms ‘heaven’, ‘heaven of heaven’ and ‘heaven of the heavens’, as well as on the biblical application to God of the opposites ‘light’ and ‘darkness’, states:

Spacium dicitur aether quia decurritur. Tot sunt caeli quot astra, si caelum intelligamus contiguum et circumstans configuratum uniuscuiusque spacium, ut caelum Telluris dicitur non solum spacium in quo est, sed et quantum spacii perambit ipsum distinctum a spacio perambiente Lunam, et alia (quae circa sunt) corpora mundana. Caelum caeli est spacium unius synodi sicut in quo hic sol est cum suis planetis. Caelum caelorum est maximum et immensum spacium; quod et aether dicitur, quia totum est percurribile, et quia in toto maxime flagrant omnia. [...]. Sedes

¹¹¹ G. Bruno, *Camoeracensis Acrotismus*, *op. cit.*, p. 148: “Certe si motus non esset et mutatio, nihil temporale diceretur, idem unumque esset omnium tempus, una eademque duratio, quae aeternitas dicitur”; *id.*, *Acrotismo Cameracense*, *op. cit.*, p. 105.

¹¹² See note 25 above.

¹¹³ G. Bruno, *Camoeracensis Acrotismus*, *op. cit.*, p. 149: “Quod autem ad quietem attinet, et hanc per motum mensurari dicimus atque tempus”; *id.*, *Acrotismo Cameracense*, *op. cit.*, p. 106.

¹¹⁴ G. Bruno, *Camoeracensis Acrotismus*, *op. cit.*, art. 43, p. 156: “Si rite definiatur tempus, videbitur per se illi continuitatem convenire, quia per se quantum continuum est”, italics are ours; *id.*, *Acrotismo Cameracense*, *op. cit.*, p. 110.

¹¹⁵ Cf. Bruno, *De immenso*, I, 12, *cit. supra*, note 110, and *id.*, *De gli eroici furori*, in *id.*, *Œuvres complètes*, vol. VII. Ed. G. Aquilecchia, trans. P.-H. Michel. Paris: Les Belles Lettres, 1999, p. 235, where eternity is described, from Boethius (*De consolazione philosophiae*, V, 6, 10: “Aeternitas igitur est interminabilis vitae tota simul ac perfecta possessio”), as “una possessione insieme tutta e compita”. On the transition from a Boethian eternity to an eternity as “existence at all time”, see Luca Bianchi, “Abiding then: Eternity of God and Eternity of the World from Hobbes to the *Encyclopédie*”, in P. Porro (ed.), *The Medieval Concept of Time: Studies on the Scholastic Debate and its Reception in Early Modern Philosophy*. Leiden: Brill, 2001, pp. 543-560.

¹¹⁶ G. Bruno, *De immenso*, I, 8, *op. cit.*, vol. I, 1, p. 231. For a discussion of the definition, see E. Grant, *Much Ado about Nothing*, *op. cit.*, pp. 186-192.

¹¹⁷ E. Grant, *Much Ado about Nothing*, *op. cit.*, p. 191.

¹¹⁸ *Ibid.*, p. 190.

¹¹⁹ *Ibid.*

¹²⁰ In what follows we rely on M. Á. Granada, “Giordano Bruno’s Concept of Space”, *op. cit.*, particularly pp. 166-176. See also *id.*, “Bruno and Maimonides: Matter as a Woman and the Ontological Status of Matter”, *Bruniana & Campanelliana*, 23 (2017), pp. 457-472.

ergo beatorum sunt astra: sedes deorum est aether seu caelum: astra quippe Deos secunda ratione dico. *Sedes vero Dei est universum ubique totum immensum caelum, vacuum spacium cuius est plenitudo; pater lucis comprehendentis tenebras, ineffabilis.*¹²¹

If the 'heaven' is the space of a star or world and the 'heaven of heaven' the space occupied by a planetary system (*synodus ex mundis*), the 'heaven of the heavens' is infinite space; and just as the first two (finite) regions of space are occupied by gods (the stars or worlds, which Bruno calls gods "in a second sense"), so the 'heaven of heavens' or infinite space is the "seat of God", which Bruno seems to say is filled with God as "father of light comprising darkness".¹²² In *De la causa*, after having stated (in the third and fourth dialogues) that the material principle is infinite in total correspondence with the infinity of the active principle (God), Bruno affirms (in the fifth and last dialogue) that the two principles (matter and form, that is, God as mind and intellect possessing all the forms) coincide in the unity of the infinite universe as a single substance, which is God's expression or self-realization:

Con il suo modo di filosofare gli Peripatetici e molti Platonici alla moltitudine de le cose, come al mezzo, fanno procedere il purissimo atto [God] da uno estremo, e la purissima potenza [i. e. matter] da l'altro. Come vogliono altri per certa metafora convenir le tenebre e

la luce alla costituzione di innumerabili gradi di forme, effigie, figure e colori. Apresso i quali, che considerano due principii e due principii, soccorreno *altri nemici et impazienti di poliarchia* [Bruno], e fanno *concorrere que' doi in uno*, che medesimamente è abisso e tenebra, chiarezza e luce, oscurità profonda et impenetrabile, luce superna et inaccessibile.¹²³

Further on, Bruno points out that to unity

tendeva con il pensiero il povero Aristotele ponendo la privazione (a cui è congiunta certa disposizione) come progenitrice, parente e madre della forma: ma non vi poté aggiungere, non ha possuto arrivarvi; perché fermando il piè nel geno de l'opposizione, rimase inceppato di maniera, che non [...] giunse né fissò gli occhi al scopo: dal quale errò a tutta passata, dicendo i contrarii non posser attualmente convenire in soggetto medesimo.¹²⁴

In a Latin work that remained in manuscript, the *Lampas triginta statuarum*, written in two phases between 1587 and 1591, that is, in the same period in which he finished *De immenso*, Bruno presents (in connection with those passages in *De immenso* that contemplate God's relation with space and probably in connection too with the critique of ontological dualism in *De la causa*) "six principles" distributed in two triads, called 'superior' and 'inferior', which we can represent with the following figure:¹²⁵

Derivation: Father → Son			
Upper triad (Male)	Father	Intellect	Spirit (Soul)
	Mind	Apollo	Light
	Plenitude	Source of the Ideas	
Inferior triad (Female)	Chaos	Orcus	Night
	Void	Privation	Matter
	Space	Desire	

¹²¹ G. Bruno, *De immenso*, IV, 14, *op. cit.*, vol. I, 2, p. 231; italics are ours.

¹²² On the application of 'light' and 'darkness' to God, see Psalms 104: 2: "he covers himself with light as with a garment"; 1 Kings 8: 12: "Yahweh, has said that he would dwell in thick darkness" (Word English Bible).

¹²³ G. Bruno, *De la causa, principio, et uno*, in id., *Œuvres complètes*. Vol. III. Ed. G. Aquilecchia, trans. L. Hersant. Paris: Les Belles Lettres, 2016, p. 291; italics are ours. The reference to the two 'princes' (of light and darkness) clearly alludes, beyond Platonism and Aristotelianism, to Gnosticism. The rejection of polyarchy is clearly inspired by Homer's *Iliad*, II, 204 ("the rule of the many [πολυκοιρανίη] is not good; let there be but one ruler") as quoted by Aristotle in *Metaphysics*, XII, 10, 1076a 4. This is a reference by Aristotle to ancient wisdom, which he, unlike Bruno, was unable to follow, so that it is justified, according to Bruno, to hold Plato and Aristotle as Gnostics, the great accusation that Bruno hurls against Palingenius in the eighth and last book of *De immenso*. As W. D. Ross comments, "Aristotle is not a thoroughgoing monist. He is a monist in the sense that he believes in one supreme ruling principle, God or the primum movens. But God is not for him all-inclusive. The sensible world is thought of as having a matter not made by God", in Aristotle, *Metaphysics, a Revised Text with Introduction and Commentary*. Ed. W. D. Ross. 2 vols. Oxford: Oxford University Press, 1924, vol. II, p. 405. According to Aristotle (*Physics*, II, 7, 198a 22-26), the efficient, formal and final cause "often coincide", but matter is not contemplated.

¹²⁴ G. Bruno, *De la causa, op. cit.*, p. 315.

¹²⁵ G. Bruno *Lampas triginta statuarum*, in id., *Opere magiche*. Ed. S. Bassi, E. Scapparone and N. Tirinnanzi. Milan: Adelphi, 2000, pp. 938-1065.

The adjectives ‘superior’ and ‘inferior’ do not entail ontological hierarchy, in accordance with the equating of matter and form in *De la causa*¹²⁶. In each triad the succession to the second and third member from the preceding one is described as that of father and son. The upper triad describes the generation of the persons in the Christian Trinity, but with an exclusively cosmological meaning, that is, eliminating the distinction between *generatio ad intra* of the Son and the Spirit and *creatio ad extra* of the universe, which receives the character of necessity and infinity proper to the trinitarian process. The same can be said of the opposite triad: empty space, privation and matter (or filled space) are also a tri-unity, the same thing or process, related to the other and complementing it, just as the production of the infinite universe is the explication of God, a God who contains in itself (as Nicholas of Cusa, Bruno’s mentor on this point, had already affirmed) the unity of the opposites, potency and act or matter and form.¹²⁷

Thus, we arrive at the relationship between empty space (Chaos) and God, the Father of the superior triad, also named *Plenitudo* (in consonance with the passage in *De immenso*, IV, 14). In *De la causa* Bruno states that God is certainly the coincidence of the opposites light and darkness (i. e. mind and space-matter) referring to a biblical passage: “La coincidenza di questo atto con l’assoluta potenza è stata molto apertamente descritta dal spirito divino dove dice: ‘Tenebrae non obscurabuntur a te. Nox sicut dies illuminabitur. Sicut tenebra eius, ita et lumen eius’ [Psalms 139, 12].”¹²⁸ Both light and matter (as filled space) seem to belong equally to God, who is filled space as well as the mind that fills it with forms. Grant acutely perceived the core of the problem: if space is a primary principle not created by God, the absolute sovereignty of God is called into question, and an

insurmountable dualism arises.¹²⁹ However, from the fact that space is not the work of God, it does not follow that it is totally independent from Him. The Void or Space and the matter that fills it is God Himself,¹³⁰ just as He is the spirit-mind-intellect that fills it by introducing the forms into it. This is the true meaning of the expression “void space whose fullness is [God]” or “void space of which there is fullness” in *De immenso*, IV, 14. God is space no less than its *fullness*, chaos-abyss-darkness no less than mind-intellect-spirit, since both trinitaries are equivalent and constitute one and the same essence, that is, the substance. Thus, God and the infinite universe are one and the same, as had already been demonstrated in the fifth dialogue of *De la causa*.

Aristotle (like Plato) transmitted the erroneous concept of a duality of principles to the later metaphysical tradition. The ensuing tradition conceived matter (also the space filled by it) as entirely separated from the other three causes that coincide in one, as Maimonides had stated in his *Guide* (I, 69):

One of the opinions of the philosophers, an opinion with which I do not disagree, is that God [...] is the efficient cause, that He is the form, and that He is the end [...] in order to comprise these three causes – that is, the fact that God is the efficient cause of the world, its form, and its end.¹³¹

This affirmation is directly related to the Aristotelian concept of God as “intellection of intellection” (*noësis noëseôs*; *Metaphysics*, XII, 9, 1074b 34), which implies the coincidence and unity of intellect, intellection and intelligible, as Maimonides also states:

You already know that the following dictum of the philosophers with reference to God [...] is generally admitted: the dictum being that He is the intellect as well as the intellectually cognizing subject and the intellectually cognized object, and that those three notions form in

¹²⁶ Significantly, in the pages of the fourth dialogue of *De la causa*, in which matter as potency is assimilated to act and form, the contemporary reader known as *postillatore napoletano* (a Protestant Italian exiled in England) noted concerning the coincidence or ‘indifference’ of matter and form: “Qual differenza dunque ponete tra questa materia e Dio?”, pp. 245 and 413 in the second edition, Paris, 2016. For an exposition of the structure and relationship between the two triads, see also L. Girelli, *Bruno, Aristotele e la materia*. Bologna: Archetipo Libri, 2013, pp. 75-85. According to Girelli, “non si dà alcuna eventualità di preesistenza o di esistenza indipendente dai principi superiori del *Chaos*, dell’*Orcus* e della *Nox* in quanto la condizione di possibilità che essi rappresentano è immediatamente tradotta in realtà dall’infinita attività esplicativa della triade superiore che rappresenta le tre articolazioni del principio efficiente-formale”, p. 83. The author, however, does not go so far as to affirm the substantial unity of the two triads and maintains her analysis in the same stage of unresolved dualism denounced by Bruno in Peripatetics and the Platonists contrary to his own affirmation of the “coincidence of these two principles in one” in *De la causa*, *op. cit.*, p. 291. More in line with our reading, S. Carannante, *Giordano Bruno e la filosofia moderna: Linguaggio e metafisica*. Florence: Le Lettere, 2016, p. 291, sees in the two triads “una duplicità di piani che, giova ripeterlo, *identifica i due aspetti* – fundamentalmente eterogenei ma *coessenziali* – in cui si articola l’*unica sostanza* infinita” (p. 291; italics are ours) and says that Bruno “introduce quest’ultima [passive potency, that is, matter] nel suo stesso seno [of God] quale condizione del suo necessario esplicarsi”, p. 293.

¹²⁷ Cf. G. Bruno, *De la causa*, *op. cit.*, pp. 203-207, where Cusa’s *De possesset* is tacitly adopted.

¹²⁸ *Ibid.*, p. 213.

¹²⁹ E. Grant, *Much Ado about Nothing*, *op. cit.*, p. 191.

¹³⁰ See B. Amato, “La nozione di ‘vuoto’ in Giordano Bruno”, *Bruniana & Campanelliana*, 3 (1997), pp. 209-229: “lo spazio vuoto assurge alla stessa dignità posseduta dall’Uno nella *Causa* in quanto fondamento dell’originaria determinazione forma-materia, rendendo a questo modo plausibile l’ipotesi dell’identificazione dello spazio vuoto con Dio”, p. 226. Even Nicoletta Tirinnanzi, “‘Materia prima’ e ‘scala della natura’: Dalla *Lampas triginta statuarum* alle opere magiche”, in ead., *L’antro del filosofo: Studi su Giordano Bruno*. Rome: Edizioni di Storia e Letteratura, 2013, pp. 152-166, accepts that in the *Lampas* “l’asse del ragionamento si sposta invece [...] sulla vitalità della materia, le cui infinite metamorfosi collegano ed uniscono piani diversi dell’essere, dissolvendo di fatto lo scarto tra la triade superiore e quella inferiore”, p. 155, so that “l’immagine della scala segnala un processo che muove in direzione esattamente opposta, e dimostra che una materia unica e identica può [...] identificarsi, in ultimo, con Dio”, p. 156.

¹³¹ Maimonides, *Guide*, *op. cit.*, I, 69, vol. I, p. 167. Cf. the Latin translation: *Dux seu Director dubitantium aut perplexorum*. Ed. Augustinus Iustinianus. Paris: Jodocus Badius, 1520, fol. xxvii: “De credibilitate vero ipsorum [philosophorum] et opinione cui ego non contradico, est: quia credunt quod creator est causa efficiens & forma [&] finis: & ideo vocaverunt ipsam causam ut coniungantur in ipso tres causae: & sit ipse factor mundi & forma & finis”.

Him [...] one single notion in which there is no multiplicity.¹³²

In Germany, at the end of the eighteenth century, Solomon Maimon (1751-1800) wrote in German a Commentary to the *Guide of the Perplexed*, in which, commenting the last quoted passage, he noted: “Mais comme en Dieu rien n'est à l'état de puissance et que tout ce qui est intelligible est intelligé par lui, il en découle que Dieu, en sa qualité de sujet intelligent, son intellection et l'intelligible ne sont qu'une seule et même chose. Quelles en sont les conséquences, cela le lecteur attentif le comprendra facilement.”¹³³ And in *Giv'at ha-Moreh* (his second commentary on the *Guide*) he used the partial German translation of Bruno's *De la causa* by Friedrich Heinrich Jacobi (1789), to argue, concerning the above mentioned passage of *Guide*, I, 69 and without mentioning Spinoza, that Maimonides should also have conceived of God as a material cause, and consequently as extended:

comparé à toutes les autres causes, Dieu est la cause ultime. Car si nous posons que Dieu, qu'il soit exalté, est la forme et la fin sans qu'il soit la cause matérielle, il nous faudra envisager l'existence d'une matière éternelle, c'est-à-dire non causée [and, we may add, a space containing this eternal matter]. Or ceci contredirait au concept de Dieu, qu'il soit exalté, lui qui est la cause universelle de tous les existants. [...] Dieu, qu'il soit exalté, est, de tous les points de vue, la cause ultime. Eu égard à la complexité de la question, j'ai jugé bon de reproduire ici les propos du philosophe italien Jordan Bruno de Nola tirés de son livre sur la cause.¹³⁴

From what has been said it is clear, in our opinion, that in his concept of space (joined to the matter that fills it completely) Bruno has gone much further than Crescas and conceived, literally and not metaphorically, that space is an attribute of God. He also has thought (as Spinoza in the following century) that God is the only substance, that thought and space are His attributes and that He is the immanent or not transitive cause (not a cause transitive and separate) of the infinite and eternal universe and of the infinite modes it contains. This does not contradict Bruno's frequently expressed statement – for example in *Spaccio de la bestia trionfante*,¹³⁵ in *De gli eroici furori*¹³⁶ and in

the equivocal and intentionally ambiguous pages at the beginning of the second dialogue of *De la causa*¹³⁷ – that God himself (absolutely) is unknowable. Since we are on the manifest face of God, his other side, like the other side of the coin, is unavailable to us.

4. Conclusion

From the foregoing we can conclude that, although Giordano Bruno surely knew the work of Gianfrancesco Pico in which Crescas' critique of the Aristotelian concepts of space, void and time was included, it is not certain that Bruno knew and followed these specific ideas, using them for his own critique of Aristotle and for his own elaboration of these concepts, in part coinciding with Crescas, as well as for his affirmation of the plurality of worlds, which in Pico is mentioned only in passing. Moreover, Bruno's treatment of these topics is completely different from that of Pico. Furthermore, despite the attempts of Wolfson and Mauro Zonta (not to mention the unsubstantiated speculation of David Harari), there is no evidence of an intermediary source that provided Bruno with knowledge of Crescas' critique, nor is Crescas the only possibility for Bruno's development of his conceptions of space, time, the actual infinite universe, and the infinite plurality of worlds.

The criticism of Aristotle on these points and the positive elaborations of Crescas and Bruno, initially coinciding, may be due to their common knowledge of an ancient and medieval philosophical tradition of critical comments to Aristotle with alternative proposals – a knowledge that in Bruno is, unlike in Crescas, a consciously assumed insertion and not simply a knowledge for the defense of faith and criticism of the unacceptable philosophical rationalism. Only one argument against the plurality of worlds (that of the impossible plurality of coexistent worlds because they should proceed from generation; see p. 204 above), an argument that Crescas takes from Gersonides and is present in Bruno, for which I have no scholastic Latin sources accessible to him, would seem to make Bruno dependent on Crescas by an unknown intermediary agent, since it does not appear in Pico's work. But we have also seen that Bruno's refutation of that argument is very different from Crescas'.

For all these reasons, it seems most prudent to suspend the judgment on Bruno's dependence on Crescas and consider such dependence an unlikely possibility, attending instead to what really matters: the development and insertion of some preliminary coincidences in a cosmological and ontological conception by Bruno profoundly different from that of Crescas and marked by the appearance of the heliocentric proposal and the consequent

¹³² Maimonides, *Guide*, *op. cit.*, I, 68, vol. I, p. 163; *id.*, *Dux seu Director dubitantium*, *op. cit.*, fol. xxvii: “Iam scis verbum manifestum quod philosophi dixerunt de Creatore, quod ipse est intellectus & intelligens & intellectum: & quod ista tria sunt unum in Creatore: & non est ibi multitudo”; italics are ours.

¹³³ S. Maimon, *Commentaires de Maimonide*. Ed. and trans. M.-R. Hayoun. Paris: Cerf, 1999, p. 99.

¹³⁴ *Ibid.*, p. 261. Maimon quotes on pp. 261-268 the excerpt that Jacobi translated from *De la causa*.

¹³⁵ G. Bruno, *Spaccio de la bestia trionfante*, in *id.*, *Œuvres complètes*. Vol. V. Ed. G. Aquilecchia, trans. J. Balsamo. Paris: Les Belles Lettres, 1999, p. 427: “quel dio, come assoluto, non ha che far con noi, ma per quanto si comunica alli effetti della natura, et è più intimo a quelli che la natura istessa: de maniera che se lui non è la natura istessa, certo è la natura de la natura”.

¹³⁶ G. Bruno, *De gli eroici furori*, *op. cit.*, vol. VII, p. 391: “però a nessun pare possibile de vedere il sole, l'universale Apolline e luce assoluta per specie suprema e eccellentissima; ma sí bene la sua ombra, la sua Diana, il mondo, l'univer-

so, la natura che è nelle cose, la luce che è nell'opacità della materia: cioè quella in quanto splende nelle tenebre”.

¹³⁷ G. Bruno, *De la causa*, *op. cit.*, vol. III, p. 109: “Lasciando dunque (come voi dite) quella considerazione per quanto è superiore ad ogni senso et intelletto, consideriamo del principio e causa per quanto, in vestigio, o è la natura istessa, o pur riluce ne l'ambito e grembo di questa”. Shortly before, Bruno had said, pp. 105-107, referring to Exodus 33:23, that “della divina sustanza [...] non possiamo conoscer nulla se non per modo [...] di spalli o posteriori come dicono i Talmutisti” (cf. Maimonides, *Guide*, *op. cit.*, I, 54, vol. I, p. 123).

movement of the Earth, which Bruno assumes as physical truths that made possible the affirmation of the actual infinite and eternal universe. This development of Copernicanism joined a conception of the relationship between God and the universe characterized by ontological monism (substance is one), by the conception of God as infinite power that necessarily unfolds in an infinite and eternal universe with infinite worlds (planetary systems) in all its infinite extension and duration, and by the attribution to God of extension and matter. With Bruno and later with Spinoza (whose knowledge of Bruno is a problem similar to Bruno's knowledge of Crescas) a development of the scientific revolution and Enlightenment is outlined, which is profoundly different from the reconciliation with revealed religion proposed by Bacon, Descartes, Mersenne and Newton: a 'Radical Enlightenment' that would have also aroused the critical reaction of Crescas (Bruno and Spinoza are, to a certain extent, Maimonidean rationalists)¹³⁸ and that has been studied by Jonathan Israel in the great work with that title.¹³⁹

5. Bibliography

- Aristotle, *Metaphysics, a Revised Text with Introduction and Commentary*. Ed. W. D. Ross. 2 vols. Oxford: Oxford University Press, 1924.
- Aristotle, *The Complete Works. The Revised Oxford Translation*. Ed. J. Barnes. 2 vols. Princeton: Princeton University Press, 1984.
- Bruno, Giordano, *Camoeracensis Acrotismus seu rationes articularum physicorum adversus Peripateticos Parisiis propositorum*, Wittenberg, 1588, in id., *Opera latine conscripta*. Ed. F. Fiorentino et al. Naples/Florence: Morano/Le Monnier, 1879-1891. Vol. I, 1, pp. 53-190.
- Bruno, Giordano, *Cento venti articoli sulla natura e sull'universo contro i Peripatetici / Centum et viginti articuli de natura et mundo adversus Peripateticos*. Ed. E. Canone. Pisa/Rome: Fabrizio Serra, 2007.
- Bruno, Giordano, *De gli eroici furori*, in id., *Œuvres complètes*, vol. VII. Ed. G. Aquilecchia, trans. P.-H. Michel. Paris: Les Belles Lettres, 1995.
- Bruno, Giordano, *De immenso et innumerabilibus*, in id., *Opera latine conscripta*. Ed. F. Fiorentino et al. Naples/Florence: Morano/Le Monnier, 1879-1891. Vol. I, 1, pp. 191-398; I, 2, pp. 1-318.
- Bruno, Giordano, *De la causa, principio, et uno*, in id., *Œuvres complètes*. Vol. III. Ed. G. Aquilecchia, trans. Luc Hersant. Paris: Les Belles Lettres, 2016.
- Bruno, Giordano, *De l'infinito, universo e mondi*, in id., *Œuvres complètes*. Vol. IV. Ed. G. Aquilecchia, trans. J.-P. Cavaillé. Paris: Les Belles Lettres, 1995.
- Bruno, Giordano, *La cena de las Cenizas*. Trans. M. Á. Granada, Madrid: Tecnos, 2015.
- Bruno, Giordano, *Lampas triginta statuarum*, in id., *Opere magiche*. Ed. S. Bassi, E. Scapparone and N. Tirinnanzi. Milan: Adelphi, 2000, pp. 938-1065.
- Bruno, Giordano, *Spaccio de la bestia trionfante*, in id., *Œuvres complètes*. Vol. V. Ed. G. Aquilecchia, trans. J. Balsamo. Paris: Les Belles Lettres, 1999.
- Copernicus, *De revolutionibus orbium coelestium*. Nuremberg: Johann Petreius, 1543.
- Crescas, Hasdai, *Lumière de l'Éternel*. Trans. É. Smilévitch. Paris/Strasbourg: Hermann, 2010.
- Crescas, Hasdai, *Light of the Lord*. Trans. R. Weiss. Oxford: Oxford University Press, 2018.
- Maimon, Salomon, *Commentaires de Maimonide*. Ed. and trans. M.-R. Hayoun. Paris: Cerf, 1999.
- Maimonides, *Dux seu Director dubitantium aut perplexorum*. Ed. Augustinus Iustinianus. Paris: Jodocus Badius, 1520.
- Maimonides, *The Guide of the Perplexed*. Trans. S. Pines. 2 vols. Chicago/London: The University of Chicago Press, 1963.
- Nicholas of Cusa, *On Learned Ignorance. A Translation and an Appraisal of 'De docta Ignorantia'*. Trans. J. Hopkins. Minneapolis: The Arthur J. Banning Press, 1981.
- Perera, Benedictus, *De communibus omnium rerum naturalium principiis et affectionibus*. Paris: Sonnius, 1579.
- Philoponus, *Corollaries on Place and Void, with Simplicius, Against Philoponus on the Eternity of the World*. Trans. D. Furley and C. Wildberg. London: Bloomsbury, 1991.
- Pico della Mirandola, Gianfrancesco, *Examen vanitatis doctrinae gentium et veritatis christianae disciplinae*. Mirandola: Ioannes Mazochius, 1520.
- Pico della Mirandola, Gianfrancesco, *Examen vanitatis doctrinae gentium et veritatis christianae disciplinae*. Ed. N. Egel, Hamburg: Felix Meiner Verlag, 2022.
- Pico della Mirandola, Giovanni and Gianfrancesco, *Opera omnia*. Basel: Pietro Perna, 1557 (reprint Hildesheim: Georg Olms Verlag, 1969).
- Spinoza, Baruch, *Opera*. Ed. C. Gebhardt. 4 vols. Heidelberg: Carl Winter, 1972.
- Ackermann, Ari, "Hasdai Crescas and Scholastic Philosophers on the Possible Existence of Multiple Simultaneous Worlds", *Aleph*, 17 (2017), pp. 139-154.
- Amato, Barbara, "La nozione di 'vuoto' in Giordano Bruno", *Bruniana & Campanelliana*, 3 (1997), pp. 209-229.
- Bianchi, Luca, "Abiding then: Eternity of God and Eternity of the World from Hobbes to the Encyclopédie", in P. Porro (ed.), *The Medieval Concept of Time: Studies on the Scholastic Debate and its Reception in Early Modern Philosophy*. Leiden: Brill, 2001, pp. 543-560.
- Bianchi, Luca and Randi, Eugenio, *Le verità dissonanti: Aristotele alla fine del medioevo*. Rome/Bari: Laterza, 1990.
- Blum, Paul R., *Aristoteles bei Giordano Bruno. Studien zur philosophischen Rezeption*. Munich: Fink Verlag, 1980.
- Brotto, Luisa, "Giovanni Francesco Pico della Mirandola", in M. Ciliberto (ed.), *Parole, concetti*,

¹³⁸ See W. Z. Harvey, "A Portrait of Spinoza as a Maimonidean", *Journal of the History of Philosophy*, 19 (1981), pp. 151-172; C. Fraenkel, "Maimonides' God and Spinoza's 'Deus sive Natura'", *Journal of the History of Philosophy*, 44 (2006), pp. 169-215. On Bruno, see M. Á. Granada, "Bruno and Maimonides: Matter as a Woman and the Ontological Status of Matter", *op. cit.*

¹³⁹ Jonathan I. Israel, *Radical Enlightenment: Philosophy and the Making of Modernity 1650-1750*. Oxford: Oxford University Press, 2001.

- immagini*. Pisa/Florence: Edizioni della Normale/Istituto Nazionale di Studi sul Rinascimento, 2014, pp. 1484-1486.
- Carannante, Salvatore, *Giordano Bruno e la filosofia moderna: Linguaggio e metafisica*. Florence: Le Lettere, 2016.
- Duhem, Pierre, *Le système du monde*. Vol. V. Paris: Hermann, 1917.
- Frank, Daniel H. and Leaman, Oliver (eds.), *The Cambridge Companion to Medieval Jewish Philosophy*. Cambridge: Cambridge University Press, 2003.
- Fraenkel, Carlos, "Hasdai Crescas on God as the Place of the World and Spinoza's Notion of God as Res Extensa", *Aleph*, 9 (2001), pp. 77-111.
- Fraenkel, Carlos, "Maimonides' God and Spinoza's 'Deus sive Natura'", *Journal of the History of Philosophy*, 44 (2006), pp. 169-215.
- Garin, Eugenio, *Storia della filosofia italiana*. Vol. II. Turin: Einaudi, 1966.
- Girelli, Lucia, *Bruno, Aristotele e la materia*. Bologna: Archetipo Libri, 2013.
- Granada, Miguel Á., "Apologética platónica y apologética escéptica: Ficino, Savonarola, Gianfrancesco Pico", in id., *El umbral de la modernidad: Estudios sobre filosofía, religión y ciencia entre Petrarca y Descartes*. Barcelona: Herder, 2000, pp. 119-167.
- Granada, Miguel Á., "'Blasphemia vero est facere Deum alium a Deo'. La polemica di Bruno con l'aristotelismo a proposito della potenza di Dio", in E. Canone (ed.), *Lecture bruniane I. II del Lessico Intellettuale Europeo 1996-1997*. Pisa/Roma: Istituti Editoriali e Poligrafici Internazionali, 2002, pp. 151-188.
- Granada, Miguel Á., "Bruno and Maimonides: Matter as a Woman and the Ontological Status of Matter", *Bruniana & Campanelliana*, 23 (2017), pp. 457-472.
- Granada, Miguel Á., "Conflagración en el Renacimiento", *Bruniana & Campanelliana*, 26 (2020), pp. 125-146
- Granada, Miguel Á., *Filosofía y religión en el Renacimiento: de Gemisto Pletón a Galileo*. Sevilla: Cypress, 2021.
- Granada, Miguel Á., "Giordano Bruno's Concept of Space: Cosmological and Theological Aspects", in F. A. Bakker, D. Bellis and C. R. Palmerino (eds.), *Space, Imagination and the Cosmos from Antiquity to the Early Modern Period*. Cham (Switzerland): Springer, 2019, pp. 157-178.
- Granada, Miguel Á., "Giordano Bruno y la eternidad del mundo", *Endoxa*, 31 (2013), pp. 349-372.
- Granada, Miguel Á., "Libro I. La relazione Dio / mondo e la necessità dell'universo infinito", in id. and D. Tessicini (eds.), *Giordano Bruno, De immenso. Lecture critiche*. Pisa/Rome: Fabrizio Serra, 2020, pp. 47-69.
- Granada, Miguel Á., "Synodi ex mundis", in E. Canone and G. Ernst (eds.), *Enciclopedia Bruniana e Campanelliana*. Vol. II. Pisa/Rome: Fabrizio Serra, 2010, cols. 142-154.
- Granada, Miguel Á., "The Concept of Time in Giordano Bruno: Cosmic Times and Eternity", in P. Porro (ed.), *The Medieval Concept of Time: Studies on the Scholastic Debate and its Reception in Early Modern Philosophy*. Leiden: Brill, 2001, pp. 477-505.
- Grant, Edward, *Much Ado About Nothing: Theories of Space and Vacuum from the Middle Ages to the Scientific Revolution*. Cambridge: Cambridge University Press, 1981.
- Hamesse, Jacqueline, *Les Auctoritates Aristotelis: Un florilège médiéval. Étude historique et édition critique*. Louvain/Paris: Publications Universitaires/ Béatrice Nauwelaerts, 1974.
- Harari, David, "Some Lost Writings of Judah Abravanel (1465?-1535?) Found in the Works of Giordano Bruno (1548-1600)", *Shofar*, 10 (1992), pp. 62-89.
- Harari, David, "Who was the Learned Jew that Made Known Hasdai Crescas' *The Light of the Lord* to Gianfrancesco Pico della Mirandola?", *Jerusalem Studies in Jewish Thought*, 14 (1998), pp. 257-269 (Hebrew).
- Harvey, Warren Zev, "A Portrait of Spinoza as a Maimonidean", *Journal of the History of Philosophy*, 19 (1981), pp. 151-172.
- Harvey, Warren Zev, *Physics and Metaphysics in Hasdai Crescas*. Amsterdam: J. C. Gieben, 1998.
- Israel, Jonathan I., *Radical Enlightenment: Philosophy and the Making of Modernity 1650-1750*. Oxford: Oxford University Press, 2001.
- Joël, Manuel, *Don Hasdai Crescas' religionsphilosophische Lehren in ihrem geschichtlichen Einflusse*. Breslau: Schletter'sche Buchhandlung, 1866.
- Knox, Dilwyn, "Libro II. La perfezione dell'universo", in M. Á. Granada and D. Tessicini (eds.), *Giordano Bruno, 'De immenso'. Lecture critiche*. Pisa/Rome: Fabrizio Serra, 2020, pp. 71-102.
- Langermann, Y. Tzvi, "East and West in Hasdai Crescas: Some Reflections on History and Historiography", in id. and J. Stern (eds.), *Adaptations and Innovations: Studies on the Interaction between Jewish and Islamic Thought and Literature from the Early Middle Ages to the Late Twentieth Century*. Paris/Louvain/Dudley, MA: Peeters, 2007, pp. 229-248.
- Mahnke, Dietrich, *Unendliche Sphäre und Allmittelpunkt*. Halle: Niemeyer, 1937.
- Malaguti, Francesco. "Giordano Bruno and Jewish Thought: Reception and Reinterpretation", *International Journal of Theology, Philosophy and Science*, 8 (2021), pp. 64-84.
- Pappalardo, Lucia, *Gianfrancesco Pico della Mirandola: fede, immaginazione e scetticismo*. Turnhout: Brepols, 2014.
- Pines, Shlomo, "The Limitations of Human Knowledge according to Al-Farabi, Ibn Bajja, and Maimonides", in I. Twersky (ed.), *Studies in Medieval Jewish History and Literature*. Vol. I. Cambridge, MA: Harvard University Press, 1979, pp. 82-109.
- Pines, Shlomo, "Scholasticism after Thomas Aquinas and the Teachings of Hasdai Crescas and his Predecessors", in id., *Collected Works*. Vol. V. Jerusalem: The Magnes Press, 1997, pp. 489-589.
- Schmitt, Charles B., *Gianfrancesco Pico della Mirandola (1469-1533) and his Critique of Aristotle*. The Hague: Martinus Nijhoff, 1967.

- Sorabji, Richard (ed.), *John Philoponus and the Rejection of Aristotelian Science*. London/Ithaca, NY: Cornell University Press, 1987.
- Sorabji, Richard, *Matter, Space, & Motion: Theories in Antiquity and Their Sequel*. Ithaca, NY: Cornell University Press, 1988.
- Spampanato, Vincenzo, *Vita di Giordano Bruno con documenti editi e inediti*. Messina: Principato, 1921.
- Stern, Josef, *The Matter and Form of Maimonides's 'Guide'*. Cambridge, MA/London: Harvard University Press, 2013.
- Tessicini, Dario, *I dintorni dell'infinito: Giordano Bruno e l'astronomia del Cinquecento*. Pisa/Rome: Fabrizio Serra, 2007.
- Tirinnanzi, Nicoletta, "'Materia prima' e 'scala della natura': Dalla *Lampas triginta statuarum* alle opere magiche", in ead., *L'antro del filosofo: Studi su Giordano Bruno*. Rome: Edizioni di Storia e Letteratura, 2013, pp. 152-166.
- Wolfson, Harry Austryn, *Crescas' Critique of Aristotle: Problems of Aristotle's Physics in Jewish and Arabic Philosophy*. Cambridge, MA: Harvard University Press, 1929.
- Wolfson, Harry Austryn, "Note on Crescas's Definition of Time", *Jewish Quarterly Review*, 10 (1919), pp. 1-17.
- Wolfson, Harry Austryn, *The Philosophy of Spinoza*. 2 vols. New York: Meridian Books, 1958.
- Zonta, Mauro, "Due note sulle fonti ebraiche di Giovanni Pico e Giordano Bruno", *Rinascimento*, 40 (2000), pp. 143-153.
- Zonta, Mauro, "The Influence of Hasdai Crescas's Philosophy on Some Aspects of Sixteenth-Century Philosophy and Science", in J. Helm and A. Winkelmann (eds.), *Religious Confessions and the Sciences in the Sixteenth Century*. Leiden/Boston/Köln: Brill, 2001, pp. 71-78.