History of Logic from Aristotle to Gödel (www.historyoflogic.com)

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Selected Bibliography on the Early Stoic Logicians: Zeno, Cleanthes, Chrysippus

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Early Stoic Logicians: Zeno of Citium, Cleanthes, Chrysippus (Current page)

Zeno of Citium

Editions

1. Pearson Alfred Chilton. 1891. *The Fragments of Zeno and Cleanthes.* London: C. J. Clay & Sons.
2. *Zeno et Zenonis discipuli*. Edited by Arnim Hans Friedrich August von. Stuttgart: Teubner 1905.
Stoicorum Veterum Fragmenta: Vol. I.

Studies

1. Adorno, Francesco. 1957. "Sul significato del termine *hyparchon* in Zenone stoico." *La Parola del Passato* no. 12:362-374.

2. ———. 1959. "Sul significato del termine *mnemonichon* in Zenone stoico." *La Parola del Passato* no. 14.

3. ———. 1966. "I fondamenti della logica in Zenone stoico." In *Studi sul pensiero greco*, 121-178. Firenze: Sansoni.

4. Brinkmann, Klaus. 1997. "Zénon, matérialiste et nominaliste?" *Diotima* no. 25:48-55.

"The article questions the standard perception of Stoic philosophy as materialist and nominalist in nature. Rather than being materialistic, Stoic ontology represents a consistent hylemorphism in which nothing exists without matter and which is intended to circumvent and the matter-form dualism in Aristotle's metaphysics and to avoid Aristotle's epistemological problem of the unknowability of matter. Similarly, Stoic semantics is not entirely nominalistic. Although Stoic universals ("ennoemata", "ennoiai") are "post rem", unlike word or sentence meanings ("lekta") they are nonmental noematic or conceptual structures."

5. Döring, August. 1902. "Zeno, der Gründer der Stoa." *Preussische Jahrbücher* no. 107:213-242.

6. Fritz, Kurt von. 1972. "Zenon von Kition." In *Pauly's Real-Encyclopädie. Band 10 A*, 83-121.

7. Graeser, Andreas. 1975. *Zenon von Kition. Positionen und Probleme*. Berlin: Walter de Gruyter.

See in particular: Teil I. *Zur Logik,* pp. 8-81.

Review by Jaap Mansfeld: *Zeno of Citium. Critical observations on a recent study*, Mnemosyne, 31, 1978, pp. 134-178.

8. Hunt, Harold Arthur Kinross. 1976. "A Physical Interpretation of the Universe. The Doctrines of Zeno the Stoic." In. Melbourne: Melbourne University Press.

9. Ieorodiakonou, Katerina. 2002. "Zeno's Arguments." In *Zeno of Citium and his legacy. The philosophy of Zeno*, edited by Scaltsas, Theodore and Mason, Andrew S., 81-112. Larnaca: The Municipality of Larnaca.

10. Mansfeld, Jaap. 1978. "Zeno of Citium: critical observations on a recent study." *Mnemosyne* no. 31:134-178.

Critical review of: A. Graeser, *Zenon von Kition. Positionen und Probleme*.

11. ———. 2002. "Zeno on the Unity of Philosophy." In *Zeno of Citium and his legacy. The philosophy of Zeno*, edited by Scaltsas, Theodore and Mason, Andrew S. Larnaca: The Municipality of Larnaca.

Also published in *Phronesis*, 48, 2003, pp. 116-131.

"The formula "the elements of *logos*" in the Zeno quotation by Epictetus at Arrian, *Diss*. 4.8.12 need not, pace e.g. von Arnim, pertain to the parts of speech, but more probably means the elements, i.e. primary theorems of philosophical theory, or doctrine. Theory moreover should become internalized to the soul and "lived": philosophy is also the so-called "art of life". These theorems are to be distinguished but should reciprocally entail each other. Philosophy according to Zeno is both tripartite and one, and tripartite especially in that its parts (and subparts) cannot be transferred simultaneously: of necessity these have to taught and learned one after the other."

12. Pachet, Pierre. 1975. "La deixis selon Zénon et Chrysippe." *Phronesis.A Journal for Ancient Philosophy* no. 20:241-246.

13. Pohlenz, Max. 1938. "Zenon und Chrysipp." *Akademie der Wissenschaften in Go?ttingen.Philologisch-Historische Klasse.Nachrichten*:173-210.

Neue Folge. Fachgruppe 1. Altertumswissenschaften Bd. 2, Nr. 9.

14. ———. 1940. "Grundfragen der stoischen Philosophie." *Abhandlungen der Gesellschaft der Wissenschaften zu Go?ttingen.Philologisch-Historische Klasse*:1-122.

Folge 1, Nr. 26.

15. Rist, John M. 2006. "Zeno and the Origins of Stoic Logic." In *Les Stoïciens et leur logique*, edited by Brunschwig, Jacques, 13-28. Paris: Vrin.

Actes du Colloque de Chantilly 18-22 septembre 1976.

Première édition 1978; deuxième édition, revue, augmentée et mise à jour (reproduit la pagination de l'édition originale).

"I I have attempted to sketch what Zeno left behind for Chrysippus to develop (63). Cleanthes has been mentionned in passing, and his contributions are, so far as we can see, largely limited to additional work of the same general sort as his master. He too took an interest in the work of Diodorus Cronus, and as we have seen, is the first recorded Stoic to have discussed the notorious Master Argument and its theory about the possible and the necessary. Probably some form of a theory of *lekta* may be ascribed to him, as Clement of Alexandria tells us. But how much he said on the topic is beyond our ken; probably not very much. For I am personally even Inclined to think that it is more likely to have been Chrysippus who formally added *lekta* to the list of incorporeals, though such an addition might be implicit in the thought of anyone who postulated that there are "non-existents": subjects of *meaningful* discourse which cannot be put in category One, the category of what exists. For it is hard to see how that which does not exist can be corporeal. Perhaps it was from some such considerations that the notion of "meaning" itself arose, as well as the thesis that words may have a sense but no reference." p. 27

"Résumé. Avant le développement systématique que Chrysippe donna à la logique stoicienne, peut-on préciser l'eeuvre de Zénon dans ce domaine? Souhaitant donne à l'idée de nature un contenu plus positif que ne le faisait la morale cynique, il devait rencontrer l'hypothèque éléatique; il fut l'élève et le condisciple de plusieurs dialecticiens mégariques (bien qu'on ne lui attribue pas de position dans le problème du Dominateur et des possibles). Il a dû s'intéresser aussi à la théorie des signes et au problème du critère de validité du conditionnel, sur lequel il adopte la position de Philon (que Chrysippe abandonnera sous la pression des critiques de Diodore). Ce problème est lié à celui de la nature du sage; en reconnaissant dans l'aptitude à inférer un aspect fondamental de la nature humaine, Zénon accélérait sa rupture avec le cynisme. Des Mégariques, Zénon a hérité certaines divergences de vocabulaire et de fond avec la logique aristotélicienne; de Stilpon, notamment, il peut avoir reçu l'idée du primat de l'individuel, contre les Formes platoniciennes et peut-être aussi contre les universaux aristotéliciens. Parmi les domaines que Zénon n'a apparemment pas touchés, on peut compter: la théorie des signifiants et des signifiés; peut-être, la notion même du *lekton* (qui aurait été rajouté, après Zénon, aux trois incorporels primitifs, nés en terrain physique), et du même coup la classification systématique des *lekta*; enfin, la théorie des indémontrables. En matière de théorie de la connaissance, c'est en revanche Zénon qui a jeté les bases de la doctrine stoïcienne; le problème était urgent, après le platonisme et le pyrrhonisme, comme le démontre l'attitude contemporaine d'Épicure.

Le Professeur Rist n'a pas souhaité rédiger de compléments pour la deuxième édition. (Note de l' éditeur)" pp. 27-28.

(63) *Ibid.* p. 153-154.

16. Scaltsas, Theodore, and Mason, Andrew S., eds. 2002. *The Philosophy of Zeno: Zeno of Citium and his Legacy*. Larnaca: The Municipality of Larnaca.

Table of Contents: Contributors VII; Preface IX; Andrew S. Mason: Introduction 1; Jacques Brunschwig: Zeno between Kition and Athens 11; David Hahm: Zeno before and after Stoicism 29; Jaap Mansfeld: Zeno on the Unity of Philosophy 57; Katerina Ierodiakonou: Zeno's Arguments 81; Anthony A. Long: Zeno's Epistemology and Plato's Theaetetus 113; David Sedley: Zeno's Definition of *phantasia kataleptike* 133; Keimpe Algra: Zeno of Citium and Stoic Cosmology: Some Notes and Two Case Studies 155; Ten Tieleman: Zeno and Psychological Monism: Some Observations on the Textual Evidence 185; Richard Sorabji: Zeno and Chrysippus on Emotion 185; Michael Erler: Stoic *oikeiosis* and Xenophon's Socrates 221; Maximilian Forschner: Theoria and Stoic Virtue: Zeno's Legacy in Cicero, *Tusculanae disputationes* V 259; Christopher Rowe: The *Politeiai* of Zeno and Plato 291; Malcolm Schofield: "Impossible Hypotheses": Was Zeno's Republic Utopian? 309; Myrto Dragona-Monachou: Zeno's Moral and Political Radicalism 309; Ian Kidd: Zeno's Oral Teaching and the Stimulating Uncertainty of his Doctrines 351; Index 375-380.

17. Schofield, Malcolm. 1983. "The Syllogisms of Zeno of Citium." *Phronesis.A Journal for Ancient Philosophy* no. 28:31-58.

18. ———. 2002. "Cicero, Zeno of Citium, and the Vocabulary of Philosophy." In *Le Style de la pensée. Recueil de textes en hommage à Jacques Brunschwig*, edited by Canto-Sperber, Monique and Pierre, Pellegrin, 412-428. Paris: Les Belles Lettres.

19. Sedley, David. 2002. "Zeno's Definition of *phantasia kataleptike*." In *Zeno of Citium and his legacy. The philosophy of Zeno*, edited by Scaltsas, Theodore and Mason, Andrew S., 133-154. Larnaca: The Municipality of Larnaca.

French version: *La définition de la "phantasia katalêptikê" par Zénon,* Gilbert Romeyer Dherbey (éd.), *Les stoïciens,* Paris: Vrin, 2005, pp. 75-92.

20. Stroux, Leonhard. 1965. *Vergleich und Metapher in der Lehre des Zenon von Kition*. Berlin: Ernst-Reuter-Gesellschaft

Cleanthes of Assos

Editions

1. Watanabe Albert Tohru. 1988. "Cleanthes Fragments: text and commentary". Unpublished Ph.D. Dissertation available at ProQuest Dissertation Express n. AAT 8908885.
2. Thom Johan Carl. 2005.*Cleanthes' Hymn to Zeus.* Tübingen: Mohr Siebeck. Text, translation, and commentary.

Studies

1. Asmis, Elizabeth. 2007. "Myth and philosophy in Cleanthes' *Hymn to Zeus*." *Greek, Roman, and Byzantine Studies* no. 47:413-429.
2. Barreau, Hervé. 2006. "Cléanthe et Chrysippe face au maître-argument de Diodore." In *Les Stoiciens et leur logique*, edited by Brunschwig, Jacques, 283-301. Paris: Vrin.
Deuxième édition revue, augmentée et mise a jour (Première edition 1978, pp. 21-40).

3. Cambronne, Patrice. 1998. "L'universel & le singulier: l'*Hymne à Zeus* de Cléanthe: notes de lecture." *Revues des études anciennes* no. 100:89-114.

4. Festugière, André. 1949. *La Révélation d'Hermès Trismégiste. II. Le Dieu cosmique*. Paris: Gabalda.
Sur Cléanthe voir pp. 310-332.

5. Goulet-Cazé, Marie-Odile. 1982. "Un syllogisme stoïcien sur la loi dans la doxographie de Diogène le Cynique à propos de Diogène Laërce VI 72." *Rheinisches Museum* no. 215:214-240.
"Le syllogisme sur la loi était un syllogisme stoïcien attribué à Diogène le Cynique dans la doxographie que lui consacre Diogène Laërce. Il n'est que l'écho d'un ensemble de syllogismes sur la loi et la cité dont l'auteur est vraisemblablement Cléanthe. La source de Diogène Laërce pourrait être Apollodore de Séleucie."

6. Guérard, Christian. 1994. "Cléanthe d'Assos." In *Dictionnaire des philosophes antiques. Vol. II*, edited by Goulet, Richard, 406-415.

7. Meijer, Pieter Ane. 2008. *Stoic Theology. Proofs for the existence of the cosmic god and of the traditional gods. Including a commentary on Cleanthes' Hymn on Zeus*. Delft: Eburon.

8. Thom, Johan C. 2005. *Cleanthes' Hym to Zeus. Text, Translation, and Commentary*. Tübingen: Mohr Siebeck.
Text, translation and commentary.
"Although the *Hymn to Zeus* is often cited as one of the most important documents of early Stoic philosophy -- indeed the only text to survive more or less intact -- it has not yet received a detailed treatment in a monograph by itself. Besides its indubitable philosophical interest, the poem also provides crucial evidence for the way philosophy came to function as a form of religion from the Hellenistic period onwards. The present study strives to pay due attention to the most relevant factors which make this poem exceptional: the philosophical and moral ideas conveyed in poetic form, the religious underpinning given to Stoicism, and the intricate interaction with the preceding literary tradition. Cleanthes offers his own philosophical answer to the human moral dilemma in terms of the Greek cultural heritage; the *Hymn to Zeus* should therefore not simply be interpreted against the background of Stoicism in general." (From the Preface).

9. Verbeke, Gérard. 1949. *Kleanthes van Assos*. Brussel: Paleis der Academiën.
Written in Dutch.

Chrysippus of Soli

Editions

1. *Chrysippi Fragmenta logica et physica*. Edited by Arnim Hans Friedrich August von. Stuttgart: Teubner 1903.
Stoicorum Veterum Fragmenta: Vol. II.

2. Crönert Wilhelm, "Die *Logika Zetemata* des Chrysippus und die übrigen Papyri logischen Inhalts aus der herculanensischen Bibliothek," *Hermes* 36: 548-579 (1901).
Traduzione italiana di Enrico Livrea in: W. Crönert - *Studi Ercolanesi* - Napoli, Morano, 1975 pp. 63-101

3. Del Mastro Gianluca, "Il *PHerc. 1380*: Crisippo, *Opera logica*," *Cronache Ercolanesi* 35: 61-70 (2005).
"Analisi paleografica di *PHerc*. 1380 e ricostruzione della *subscriptio*: si tratta dell'opera "Degli elementi del discorso e della frase" di Crisippo, di argomento

logico-dialettico, affine per tema al trattato sulle ambiguità del linguaggio tramandato in *PHerc*. 307."

4. Marrone Livia, "Le *Questioni logiche* di Crisippo (*PHerc.* 307)," *Cronache Ercolanesi* 27: 83-100 (1997).
Critical edition and Italian translation of Chrysippus' work *Logika zetemata* (Investigations in logic) found in the Herculaneum Papyrus 307.

5. Marrone Livia, "Nuove letture nel *PHerc.* 307 (*Questioni Logiche* di Crisippo)," *Cronache Ercolanesi* 12: 13-18 (1982).

6. Chrysippe. *Oeuvre philosophique.* Paris: Les Belles Lettres 2004.
Édition bilingue (textes grecs et latins, traduction française). Textes traduits et commentés par Richard Dufour.
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Studies

1. Barnes, Jonathan. 1984. "The *Logical Investigations* of Chrysippus." *Wissenschaftskolleg zu Berlin.Jahrbuch*:19-29.

2. ———. 1985. "PIQANA SUNHMMENA." *Elenchos.Rivista di Studi sul Pensiero Antico* no. 6:453-467.

3. ———. 1993. "Galen and the Utility of Logic." In *Galen und das hellenistische Erbe*, edited by Jutta, Kollesch and Nickel, Diethard, 33-52. Stuttgart: Franz Steiner.

4. ———. 1996. "The Catalogue of Chrysippus' Logical Works." In *Polyhistor: Studies in the History and Historiography of Ancient Philosophy Presented to Jaap Mansfeld on His Sixtieth Birthday*, edited by Algra, Keimpe A., Horst, Pieter van der and Runia, David, 169-184. Leiden: Brill.

Reprinted in: J. Barnes, *Mantissa: Essays in Ancient Philosophy IV*, Oxford: Clarendon Press, 2015, pp. 479-494.

The catalogue of the works of Chrysippus preserved by Diogenes Laertius (7, 189 ff.) may derive from a handbook by Chrysippus himself; this makes it a fairly reliable guide to his thought.

5. Barreau, Hervé. 2006. "Cléanthe et Chrysippe face au maître-argument de Diodore." In *Les Stoiciens et leur logique*, edited by Jacques, Brunschwig, 283-301. Paris:

Vrin.

Deuxième édition revue, augmentée et mise a jour (Première edition 1978, pp. 21-40).

6. Bobzien, Susanne. 1993. "Chrysippus' Modal Logic and its Relation to Philo and Diodorus." In *Dialektiker und Stoiker. Zur Logik der Stoa und ihrer Vorläufer*, edited by Döring, Klaus and Ebert, Theodor, 63-84. Stuttgart: Franz Steiner.

" Introduction. Chrysippus knew and discussed Philo's and Diodorus' concepts of the conditional (συνημμένον), and it is usually assumed that he developed his own in order to overcome their shortcomings. It is clear from the surviving testimonies that Chrysippus was acquainted with Philo's and Diodorus' modal notions as well and also that he developed his own in contrast with those of Diodorus and in some way incorporated Philo's modal notions.

The goal of this paper is to make clear the exact relations between the modal systems of the three logicians and to expound the philosophical reasons that might have led Chrysippus to modify his predecessors' modal concepts in the way he did. It should become apparent that Chrysippus in fact skilfully combines Philo's and Diodorus' modal notions, making only a minimal change to Diodorus' concept of possibility and obtaining thus a modal system which perfectly suits his Stoic philosophy.

A preliminary note: in order to understand the Hellenistic discussion of modalities, one has to ascribe to the Hellenistic logicians the idea that there is a 'right' modal system which 'fits the world' - or at least that different modal systems can have different degrees of adequacy in describing the world. It is this conception of modal logic that makes it such an important topic in Hellenistic philosophy. The 'right' modal theory will specify what is necessary and what is possible in the world and therewith to what extent the world is determined. Philo, Diodorus and Chrysippus provide different answers here." (P. 63)

7. ———. 2002. "Chrysippus and the Epistemic Theory of Vagueness." *Proceedings of the Aristotelian Society* no. 102:217-238.

8. ———. 2011. "The Combinatorics of Stoic Conjunction: Hipparchus refuted, Chrysippus Vindicated." *Oxford Studies in Ancient Philosophy* no. 40:157-188.

9. Bréhier, Émile. 1951. *Chrysippe et l'ancien stoïcisme*. Paris: Presses Universitarires de France.

Première édtion: Paris, Alcan, 1910.

10. Brunschwig, Jacques. 1991. "On a book-title by Chrysippus: "On the fact that the Ancients admitted Dialectic along with Demonstrations"." In *Aristotle and the Later Tradition*, edited by Blumenthal, Henry and Robinson, Howard, 81-95. Oxford: Clarendon Press.

"On what can be inferred from the title and from its place in the list of Chrysippus' works at Diogenes Laertius 7, 201; on its relevance to Plutarch's criticism of Stoic consistency at *Stoic rep*. 1035a."

11. Burke, Michael B. 1994. "Dion and Theon: An Essentialist Solution to an Ancient Puzzle." *The Journal of Philosophy* no. 91:129-139.

"The puzzle of Dion and Theon was pondered more than 2000 years ago by the Stoic philosopher Chrysippus. Puzzles of the same type engage identity theorists today. After surveying the many solutions currently on offer, and noting their drawbacks, this article presents a new solution, one that affirms the long- ignored position of Chrysippus, although not the reasoning by which he arrived at it. The solution employs (and assumes) the recently resurgent doctrine of Aristotelian >Essentialism, which provides a hitherto

unexploited resource for dealing with the full range of putative exceptions to the principle that different objects cannot simultaneously occupy the same place."

12. Burnyeat, Myles. 1982. "Gods and Heaps." In *Language and Logos. Studies in Ancient Greek Philosophy Presented to G. E. L. Owen*, edited by Schofield, Malcolm and Nussbaum, Martha, 315-338. Cambridge: Cambridge University Press.

On the *Sorite* paradox.

Reprinted in M. Burnyeat, *Explorations in Ancient and Modern Philosophy, Volume 1*, Cambridge: Cambridge University Press 2012, pp. 90-111.

13. Castagnoli, Luca. 2004. "Il condizionale crisippeo e le sue interpretazioni moderne." *Elenchos.Rivista di Studi sul Pensiero Antico* no. 25:353-395.

14. ———. 2009. "*Synártesis* crisippea e tesi di Aristotele." In *La logica nel pensiero antico*, edited by Alessandrelli, Michele and Nasti de Vincentis, Mauro, 105-164. Napoli: Bibliopolis.

"This paper aims at analysing the logic and truth-conditions of the Chrysippean conditional. In its first part some influential interpretations of s*unártesis* are examined, their shortcomings are disclosed, and two distinct possible versions of the truth-conditions of s*unártesis* are proposed and spelled out in outline. In the second part the question is investigated of whether the so-called Aristotle's thesis and Boethius' thesis can be regarded as genuine properties of the Chrysippean conditional, as some scholars have interestingly maintained. Textual evidence is exhibited suggesting that it is likely that such theses were valid in Stoic logic. Finally, the problem of how to reconcile the purported truth of these theses with some prima facie incompatible arguments attested by our sources is explored: some possible explanations for the alleged inconsistency are examined."

15. Cavini, Walter. 1972. "I sillogismi ipotetici del papiro parigino attribuito a Crisippo." In *Studi classici in onore di Quintino Cataudella. Vol I*, 39-43. Catania: Università di Catania. Facoltà di lettere e filosofia.

16. ———. 1993. "Chrysippus on speaking truly and the Liar." In *Dialektiker und Stoiker. Zur Logik der Stoa und ihrer Vorläufer*, edited by Döring, Klaus and Ebert, Theodor, 85-109. Stuttgart: Franz Steiner.

"Introduction. Semantics as a philosophical discipline is the study of notions like meaning, reference and truth, i.e. of the relationship between language and the world, between what we say and what we talk about. A ‘semantic assertion’, in particular, is the ascription of a truth value to a proposition by applying semantic predicates like the adjectives ‘true’ and ‘false’ in their predicative use or position.1 A salient feature of ancient Greek, in this regard, is the occurrence both of semantic adjectives, like αληθή? and ψευδή?, and of semantic verbs, namely άληθεύω and ψεύδομαι {speak truly and speak falsely respectively).

The philosophical import of Greek semantic verbs is at least threefold. First, they are a way of expressing basic semantic principles like Bivalence or the Correspondence and the Equivalence Theses. Second, they are the way of formulating semantic paradoxes like the Liar or the Truth-teller: for, presumably, the Greek Liar says nothing but ‘εγώ ψεύδομαι’ (T am speaking falsely’), and the Greek Truth-teller (by analogy) nothing but ‘εγώ αληθεύω’ (T am speaking truly’). Third, they are the main ‘non-logical’ ingredients of Stoic ‘semantic arguments’, namely of the άμεθόδω? περαίνοντε? λόγοι which have semantic verbs among their ‘non-logical constants’.

My overall aim in this paper is to show that in Stoic logic semantic principles are the ground both for the validity of the semantic arguments and for the formulation (and

solution) of the semantic paradoxes. The paper falls into three main sections. First, an outline is given of Stoic semantic principles and arguments, mainly on the basis of Alexander of Aphrodisias' and Galen's testimony on the Stoic 'unmethodicals', and of Cicero's report on the Stoic Liar. Second, on this basis a Stoic formulation of the Liar argument as a chain of semantic unmethodicals is provided. And finally, a Chrysippean solution to the Liar is suggested, mainly on the basis of Plutarch's report on Chrysippus' Liar and by analogy with the Truthteller. The 'upsetting' final result is that on Chrysippus' view the Liar assertion 'εγώ ψεύδομαι' (and nothing else) proves to be not only 'ungrounded' as to its truth value but also logically consistent, on a par with the Truth-teller." (p. 85)

(1) For 'semantic assertion' and the Liar cf. in particular Usberti *Logica, verità e paradosso*, Milano, Feltrinelli Bocca, 1980.

17. Celluprica, Vincenza. 1977. "L'argomento dominatore di Diodoro Crono e il concetto di possibile in Crisippo." In *Scuole socratiche minori e filosofia ellenistica*, edited by Giannantoni, Gabriele, 55-73. Bologna: Il Mulino.

18. Croenert, Wilhelm. 1901. "Die *logika zetemata* des Chrysippos und die übrigen Papyri logischen Inhalts aus der Herculanensischen Bibliothek." *Hermes* no. 36:548-579.

Traduzione italiana: W. Crönert, *Studi Ercolanesi*, Introduzione e traduzione di Enrico Livrea, Napoli, Morano, 1975, pp. 65-86.

19. Del Mastro, Gianluca. 2005. "Il PHerc 1380: Crisippo, *Opera logica*." *Cronache Ercolanesi* no. 35:61-70.

20. ———. 2007. "Un'opera logica di Crisippo nel *PHerc.* 1380." In *Proceedings of the 24th Congress of papyrology. Helsinki, 1-7 August 2004*, edited by Frösén, Jaakko, Purola, Tiina and Salmenkivi, Erja, 249-258. Helsinki: Societas Scientarum Fennica.

21. Donini, Pierluigi. 1973. "Crisippo e la nozione del possibile." *Rivista di Filologia* no. 101:333-351.

22. Dorandi, Tiziano. 2005. "La tradition papyrologique des stoiciens." In *Les stoiciens*, edited by Romeyer-Dherbey, Gilbert and Gourinat, Jean-Baptiste, 29-52. Paris: Vrin.

23. Gould, Josiah. 1967. "Chrysippus: on the criteria for the truth of a conditional proposition." *Phronesis.A Journal for Ancient Philosophy* no. 12:156-161.

24. ———. 1970. *The Philosophy of Chrysippus*. Leiden: Brill.

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25. Goulet, Richard. 1994. "Chrysippe de Soles." In *Dictionnaire des philosophes antiques. Tome 2: de Babélyca d'Argos à Dyscolius*, edited by Goulet, Richard, 329-365.

26. Hadot, Pierre. 1994. "Liste commentée des oeuvres de Chrysippe (D. L. VII 189-202)." In *Dictionnaire des philosophes antiques. Tome 2: de Babélyca d'Argos à Dyscolius*, edited by Goulet, Richard, 336-356. Paris: CNRS-Éditions.

27. Hankinson, R. J. 2007. "Self-refutation and the Sorites." In *Maieusis. Essays in Ancient Philosophy in Honour of Myles Burnyeat*, edited by Scott, Dominic, 351-373. New York: Oxford University Press.

"More than twenty years ago, Myles Burnyeat (1982) published an important article on the sorites;(3) a few years earlier he had written two ground-breaking pieces on Protagorean self-refutation.(4) So, if nothing else, at least the title of this article is an appropriate one for something written in honour of and out of admiration for my former graduate supervisor.

My aim is relatively modest. I do not seek to discern a generalized ancient 'solution' to the 'paradox',(5) or to offer one in my own voice (although I will make one or two tentative suggestions). My main purpose is to take seriously a passing hint of Cicero's, one which has generally been either ignored or treated simply as a joke,(6) that the sorites may be applied to itself, or to the more general notion of coherent argument, with potentially devastating results. I say 'potentially devastating', since it is unclear whether the threatened disaster must occur, and if it does, which of the opposing sides in the dispute it is potentially disastrous for. As such, the debate as I shall reconstruct it mirrors that between Sceptics and Dogmatists as to the question of whether sceptical arguments against argument are self-refuting, and if so, what the appropriate upshot of that ought to be.(7)" (pp. 351-352)

(3) 'Gods and Heaps'.

(4) 'Protagoras and Self-Refutation in Later Greek Philosophy' (1976a); 'Protagoras and Self-Refutation in Plato' (1976b).

(5) 'Paradox' in scare-quotes since the puzzle does not have the logical form of a true paradox: viz. of a sentence that is true if and only if it is false (rather, it has the form of an apparently sound argument with an apparently false conclusion: of course that's bad enough); 'solution' similarly flagged because I am doubtful whether the puzzle—or puzzles—as such can yield to a single authoritative diagnosis. But these issues are largely irrelevant to the concerns of the present paper.

(6) A partial exception to this general neglect is Myles himself (Burnyeat 1982: 327 n. 33). It was thinking about this footnote (and that of Barnes (1982: 57 n. 60)) that first started me down the road followed by this paper more than twenty years ago.

(7) See Sext. *Pyr*. 2. 185–92; *Math*. 8. 465–80; and see McPherran 1987.

References

Barnes, J. (1982), 'Medicine, Experience and Logic', in Barnes et al. (1982), 24–68.

Barnes et al. (1982), S*cience and Speculation: Studies in Hellenistic Theory and Practice*. Cambridge.

Burnyeat, M. F. (1976a), Protagoras and Self-Refutation in Later Greek Philosophy', *Philosophical Review*, 85: 44–69.

(1976b), 'Protagoras and Self-Refutation in Plato's Theaetetus', *Philosophical Review*, 85: 172–95; repr. in Everson (1990), 39–59.

(1982), 'Gods and Heaps', in Schofield and Nussbaum (1982), 315–38.

Everson, S. (1990) (ed.), *Epistemology, Companions to Ancient Thought*, I. Cambridge.

McPherran, M. L. (1987), 'Skeptical Homeopathy and Self-Refutation', Phronesis, 32: 290–328.

Schofield, M., and Nussbaum, M. C. (1982) (eds.), *Language and Logos*. Cambridge.

28. Hershbell, Jackson P. 1993. "Epictetus and Chrysippus." *Illinois Classical Studies* no. 18:139-146.

29. Hunter, Graeme. 1994. "A Ciceronian critique of Chrysippus." *Apeiron* no. 27:17-23.

Analysis of Cicero's argument at *De fato* 6 against Chrysippus' doctrine about future contingency.

30. Ide, Harry A. 1992. "Chrysippus's Response to Diodorus's Master Argument." *History and Philosophy* no. 13:133-148.

Abstract: "Chrysippus claims that some propositions perish. including some true conditionals whose consequent is impossible and antecedent is possible, to which he appeals against Diodorus's Master Argument. On the standard interpretation. perished propositions lack truth values, and these conditionals are true at the same time as their antecedents are possible and consequents impossible. But perished propositions are false. and Chrysippus's conditionals are true when their antecedent and consequent are possible, and false when their antecedent is possible and consequent impossible. The claim of the Master Argument that Chrysippus rejects, then, is stronger that usually supposed."

31. Irigoin, Jean. 1990. "Chrysippe, *Sur les propositions négatives*." In *Mise en page et mise en texte du livre manuscrit*, edited by Martin, Henri Jean and Vezin, Jean, 34-36. Paris: Éditions du Cercle de la Librairie-Promodis.

La disposition du texte dans le Papirus Paris 2 (= P. Louvre inv. 2326), fragment d'un ouvrage de logique attribué traditionnellement à Chrysippe.

32. Leib, Ethan J. 2001. "On the *sorites*: toward a better understanding of Chrysippus." *Ancient Philosophy* no. 21:147-159.

"The paper explores the logical paradox of the sorites and its scope. By examining the original sources in Diogenes, Sextus, and Cicero and contemporary commentators (Barnes and Burnyeat), and elaborating upon the context in which the paradox arose (the debate between the Stoics and the Skeptics), I hope to illuminate what the paradox can and cannot accomplish. By focusing on the dialogical nature of the original presentation of the paradox, I outline a better understanding than has been offered previously of the strategy that the Stoics deployed, under their leader Chrysippus, in dealing with the skeptical challenge."

33. Malatesta, Michele. 1998. "On one instance of the Chrysippean syllogism of the dog in Plato's *Sophista* 252e 1-8." *Metalogicon* no. 11:1-16.

34. Marrone, Livia. 1984. "Il problema dei 'singolari' e dei 'plurali' nel *PHerc.* 307." In *Atti del XVII Congresso Internazionale di papirologia. Vol. II*, edited by Frösén, Jaakko, Purola, Tiina and Salmenkivi, Erja, 419-427. Napoli: Centro internazionale per lo studio dei papiri ercolanesi.

35. ———. 1984. "Proposizione e predicato in Crisippo." *Cronache Ercolanesi* no. 14:136-146.

36. ———. 1987. "Testi stoici ercolanesi." *Cronache Ercolanesi* no. 17:181-184.

37. ———. 1987. "Testi stoici ercolanesi II." *Cronache Ercolanesi* no. 18:223-225.

38. ———. 1988. "Il Mentitore nel *PHerc.* 307 (Questioni logiche di Crisippo), I." In *Proceedings of the XVIII International Congress of Papyrology. Athens 25-31 May 1986*, edited by Mandilaras, Basil G., 271-276. Athens: Greek Payrological Society.

39. ———. 1992. "L'ambiguità verbale nel *PHerc.* 307 (*Questioni logiche* di Crisippo)." In *Proceedings of the XIX International Congress of Papyrology. Cairo 2-9 September 1989*, edited by Mosallamy, Abd Alla Hassan el, 261-267. Cairo: Ain Shams University,.

"Un nouvel examen des col. 4-14 de ce papyrus montre que cette oeuvre a bien, comme le veut le genre des *zetemata*, un caractère aporétique, présentant des propositions dans lesquelles le *semainomenon* n'est pas exprimé clairement. La variété et la vivacité de ce texte important pour notre connaissance de la dialectique des stoïciens traduit l'existence d'un milieu culturel riche en innovations et en provocations."

40. ———. 1993. "Gnoseologia stoica nel *PHerc* 307." In *Ercolano 1738-1988. 250 anni di ricerca archeologica. Atti del Convegno internazionale Ravello-Ercolano-Napoli-Pompei, 30 ottobre-5 novembre 1988*, edited by Dell'Orto, Luisa Franchi, 339-341. Roma: "L'Erma" di Bretschneider.

41. ———. 1999. "Logica nei papiri ercolanesi." In *Testimonianze matematiche a Napoli. Atti del Convegno di Napoli, 19 marzo 1991*, edited by Carbone, Luciano and Palladino, Franco, 153-163. Napoli: La Città del Sole.

42. ———. 2000. "La logica degli epicurei e degli stoici: Filodemo e Crisippo." *Cronache Ercolanesi* no. 30:111-118.

Profilo dei trattati filodemei di epistemologia, fondati sulla rielaborazione delle lezioni di Zenone Sidonio (*PHerc*. 1389, 1003, 671, 861, 1065), e di alcuni testi di logica stoica, con particolare attenzione alle "Questioni logiche" di Crisippo di Soli (*PHerc*. 1022, 307).

43. Mayet, Karin. 2010. *Chrysipps Logik in Ciceros philosophischen Schriften*. Tübingen: Narr Verlag.

44. Mignucci, Mario. 1983. "Alessandro di Afrodisia e la logica modale di Crisippo." In *Atti del Convegno internazionale di storia della logica*, edited by Abrusci, Michele, Casari, Ettore and Mugnai, Massino. Bologna: CLUEB.

45. ———. 1993. "The Stoic analysis of the Sorites." *Proceedings of the Aristotelian Society* no. 93:231-245.

Reprinted as Chapter 12 in A. Falcon, P. Giaretta (eds.), *Ancient Logic, Language, and Metaphysics: Selected Essays by Mario Mignucci*, New York: Routledge 2020.

46. ———. 1999. "The Liar Paradox and the Stoics." In *Topics in Stoic Philosophy*, edited by Ierodiakonou, Katerina, 54-70. Oxford: Clarendon Press.

47. Moretti, Gabriella. 1990. *Acutum dicendi genus. Brevità, oscurità, sottigliezze e paradossi nelle tradizioni retoriche degli stoici*. Bologna: Pàtron.

48. Nasti de Vincentis, Mauro. 1983. "Chrysippean implication as strict equivalence." In *Atti del Convegno internazionale di storia della logica*, edited by Abrusci, Michele, Casari, Ettore and Mugnai, Massino, 235-240. Bologna: CLUEB.

49. ———. 1994. "Connexive implication in a Chrysippean Setting." In *Logica e Filosofia della Scienza: problemi e prospettive. Atti del Congresso triennale della Società italiana di logica e filosofia delle scienze (Lucca, 7-10 gennaio 1993)*, edited by Cellucci, Carlo, Di Mario, Maria Concetta and Roncaglia, Gino, 595-603. Pisa: ETS.

50. ———. 1998. "La validità del condizionale crisippeo in Sesto Empirico e Boezio (Parte I)." *Dianoia* no. 3:45-75.

51. ———. 1999. "La validità del condizionale crisippeo in Sesto Empirico e Boezio (Parte II)." *Dianoia* no. 4:11-43.

52. ———. 2002. *Logiche della connessività. Fra logica moderna e storia della loica antica*. Bern: Haupt.

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53. ———. 2009. "Dalla tesi di Aristotele alla tesi di Boezio: una tesi per l'implicazione crisippea?" In *La logica nel pensiero antico*, edited by Alessandrelli, Michele and Nasti de Vincentis, Mauro, 165-248. Napoli: Bibliopolis.

54. ———. 2018. "Chrysippus' counterargument against the Master Argument: a reappraisal." *Northern European Journal of Philosophy* no. 19:139-159.

Abstract: "It is widely held that as a nego suppositum, Chrysippus' response to Diodorus Cronus' Master Argument is that the impossible "this man has died" follows from the possible "Dio has died". A principal claim of this article is that Chrysippus was not actually committed, against Diodorus, to the tenet that there are deductions and conditionals whereby from the possible the impossible follows. I argue that this is most likely part of a Chrysippean exemplum fictum of a real dialectical discussion and it merely reflects a Chrysippean dialectical strategy, a merely instrumental agreement (συγχώρησις) with Diodorus on the admissibility of some single-premised arguments. As historical evidence for my conjecture I highlight two key passages by Sextus Empiricus which help to understand that Chrysippus' real tenet was an ancient implicational counterpart of a deictic version of the Identity-Elimination Rule, whereas most likely, according to Diodorus the identitarian major premiss of this rule is redundant, so that it must be eliminated."

55. Pachet, Pierre. 1975. "La deixis selon Zénon et Chrysippe." *Phronesis.A Journal for Ancient Philosophy* no. 20:241-246.

56. Papazian, Michael B. 2001. "Chrysippus and the destruction of propositions: a defence of the standard interpretation." *History and Philosophy of Logic* no. 22:1-12.

"One of the most intriguing claims of Stoic logic is Chrysippus's denial of the modal principle that the impossible does not follow from the possible. Chrysippus's argument against this principle involves the idea that some propositions are 'destroyed' or 'perish'. According to the standard interpretation of Chrysippus's argument, propositions cease to exist when they are destroyed. Ide has presented an alternative interpretation according to which destroyed propositions persist after destruction and are false. I argue that Ide's alternative interpretation as well as some versions of the standard interpretation conflict with Stoic doctrines about the nature of propositions. I propose another version of the standard interpretation based on Frede's account of the Stoic theory of the proposition. I hold that this version of the standard interpretation both escapes Ide's objections and is consistent with Stoic logic and philosophy of language."

57. Pizzi, Claudio. 1998. "Implicazione crisippea e dipendenza contestuale." *Dianoia* no. 3:25-44.

58. Sedley, David. 1993. "Chrysippus on psychophysical causality." In *Passions and Perceptions. Studies in Hellenistic Philosophy of Mind. Proceedings of the Fifth Symposium Hellenisticum*, edited by Brunschwig, Jacques and Nussbaum, Martha C., 313-331. Cambridge: Cambridge University Press.

59. Tieleman, Teun. 1996. *Galen and Chrysippus on the Soul: Argument and Refutation in the De Placitis, Book II-III*. Leiden: Brill.

60. Todd, Robert B. 1973. "The Stoic Common Notions: A Reexamination and Reinterpretation." *Symbolae Osloenses*:47-75.

61. Vuillemin, Jules. 1983. "Le carré chrysippéen des modalités." *Dialectica* no. 37:235-247.

"A sentence *p* is necessary, according to Chrysippus if *p* is true and, *p* being susceptible of being false, the external circumstances prevent it from being false. This explanation is used in order to construct the modal square or rather the two modal squares. Something is specific in the chrysippean logic: from the necessity of *p* we may validly conclude that it is impossible that *not p,* while the converse conclusion is not valid."