

Evidence for Aristotle's Lost *Zoika* in Apuleius' *Apologia* 36–40

Robert Mayhew

IN 158/9 A.D., in Roman North Africa, Apuleius (ca. 124–170), author of *Metamorphoses* (or *Asinus aureus*), went to trial to defend himself against the charge of using magic.¹ He presents his defense speech in *Pro se de magia* (also known as *Apologia*).²

One of the so-called magical practices involved his interest in and use of fish, and especially exotic fish. For instance, it was claimed in this connection that he obtained his wife through magical arts and sea charms (*magicis artibus, marinis illecebris*) (41.5). He defends himself at length against any such wrongdoing (29–41).³ This is the section that interests me, in particular Apuleius' references to the works of Aristotle on animals and his own interest in fish, which he says was the product of his having

¹ *magicorum maleficiorum* (*Apol.* 1.5), *calumniā magicā* (2.2). There were also some frankly strange subsidiary charges: e.g., writing poems about toothpaste (6.1–8.7) and possessing mirrors (13.5–16.13), to name just two. A more serious charge of murder had been withdrawn (1.5–2.6). In citing the *Apologia*, I refer to the sections and subsections (e.g. 1.5) of P. Vallette, *Apulée: Apologie. Florides* (Paris 1924).

² Most of the facts of the case, and the accuracy of Apuleius' account, will not concern me. But see V. Hunink, *Apuleius of Madauros, Pro se de magia. A New Edition with Commentary* (Amsterdam 1997) I 11–20, and S. J. Harrison, *Apuleius: A Latin Sophist* (Oxford 2000) ch. 2.

³ For an overview of this part of the speech see Harrison, *Apuleius* 65–69.

been influenced and inspired by Aristotle.⁴ Previous compilers of Aristotle-fragments have included some of this material, assigning it to the lost Ἀνατομαί.⁵ I wish to reassess this material, and determine what if anything it might tell us about another lost work of his on animals, the Ζοῖκα (*Animal Matters*), a work attributed to Aristotle in Athenaeus *Deipn.* 7 and Apollonius Paradoxographus *Historiae Mirabiles* 27–28.⁶

⁴ At the end of the speech, Apuleius summarizes both the charges against him and his replies, limiting himself to two words for each charge and reply (*numera an binis verbis respondeam*). The relevant pair (103.2): “*pisces exploras*”: *Aristoteles docet* (“‘you study fish’: Aristotle teaches [sc. this]”).

⁵ V. Rose, in all three of his collections of fragments, considers the Ἀνατομαί and the Ζωϊκά (see the following note) the same work: *Aristoteles Pseudepigraphus I Fragmenta Aristotelis Philosophica* (Leipzig 1863); *Aristotelis qui ferebantur librorum fragmenta, Aristotelis opera V* (Berlin 1870); *Aristotelis qui ferebantur librorum fragmenta* (Leipzig 1886). See F 295.3 Rose¹ (*Apol.* 36 and 40); F 307.5 Rose² (*Apol.* 40); no F Rose³ (but he quotes from *Apol.* 36 and 40). E. Heitz, *Fragmenta Aristotelis* (Paris 1869) 171, includes no fragments under his heading Ἀνατομῶν, rather he lists passages, including *Apol.* 36 and 40; cf. Heitz, *Die verlorenen Schriften des Aristoteles* (Leipzig 1865) 75–76, which includes a brief but on target criticism of Rose’s view that the Ζωϊκά and Ἀνατομαί are the same. More recently, in O. Gigon, *Aristotelis Opera (ex recensione I. Bekkeri) III² Librorum Deperditorum Fragmenta* (Berlin 1987) 493–494, F 295, under the heading Ἀνατομῶν, includes *Apol.* 36, 40–41, and 103.

⁶ On the nature of the Ζοῖκα, and the fragments from it in these two works, see R. Mayhew, “Athenaeus’ *Deipnosophistae* 7 and Aristotle’s lost Ζοῖκα or *On Fish*,” in A. Mesquita et al. (eds.), *Revisiting Aristotle’s Fragments: New Essays on the Fragments of Aristotle’s Lost Works* (Berlin 2020) 109–139. I should mention that my operating hypothesis (which it is beyond the scope of this brief essay to explain or defend in full) is that the work called Ζοῖκα and attributed to Aristotle by Athenaeus and Apollonius was a genuine work of Aristotle (perhaps in collaboration with others) and that one should be able to discern its nature and recover some of its content by considering not only what these two say or imply about such a work, but also what other ancient authors who discuss Aristotle on animals (e.g. Apuleius) have to say, even though they omit a reference to any title. I believe this hypothesis gets further support from the fact that the Ζοῖκα (judging from the evidence in Athenaeus) appears to be the kind of work that had a distinct role to play in Aristotle’s biological enterprise

In *Apol.* 36.3–4 Apuleius explains his (entirely proper) interest in fish:⁷

Legat veterum philosophorum monumenta, tandem ut intellegat non me primum haec requisisse, sed iam pridem maiores meos, Aristotelem dico et Theophrastum et Eudemum et Lyconem ceterosque Platonis minores, qui plurimos libros de genitu animalium deque victu deque particulis deque omni differentia reliquerunt. Bene quod apud te, Maxime, causa agitur, qui pro tua eruditione legisti profecto Aristotelis περί ζώων γενέσεως, †περί ζώων ἀνατομῆς†,⁸ περί ζώων ἱστορίας multiiuga volumina, praeterea problemata innumera eiusdem, tum ex eadem secta ceterorum, in quibus id genus varia tractantur.

Let him [sc. his accuser Aemilianus] read the works of the ancient philosophers, so he can at last learn that I was not the first to have investigated these matters, but that my predecessors did so long ago—I mean Aristotle, Theophrastus, Eudemus, Lyco, and the rest of Plato’s successors, who have left behind very many books on the generation of animals, on their manner of living,⁹ on their parts, and on every differentiating characteristic. It is a good thing, Maximus, that this trial is being held before you, who in light of your learning have certainly read Aristotle’s multiple volumes *On Generation of Animals*, †*On Dissections of Animals*†, and *On History of Animals*, besides innumerable *Problemata* by the same author, as well as works by others of the same school, treating of various subjects of this kind.

but is not represented by any extant work. See A. Gotthelf, *Teleology, First Principles, and Scientific Method in Aristotle’s Biology* (Oxford 2012) 383–387, and J. G. Lennox, *Aristotle on Inquiry: Erotetic Frameworks and Domain-Specific Norms* (Cambridge 2021) 2 and 159 n.34. More below on the notebook or collection-of-data stage of Aristotelian biological inquiry.

⁷ I have used the text of R. Helm, *Apulei Platonici Madaurensis Pro se de Magia liber* (Leipzig 1912), though I follow C. P. Jones, *Apuleius: Apologia, Florida, De Deo Socratis* (Cambridge [Mass.] 2017), in matters of orthography (e.g. *victu* not *uictu*) and in his practice of not indicating obvious corrections (e.g. *Eudemum* not *[t]Eudemum*). In translating the text, I have freely made use of Jones and H. E. Butler, *Apuleius. The Apologia and Florida of Apuleius of Madaura* (Oxford 1909).

⁸ I explain below my addition of the *obeli*.

⁹ Or “on their diet” (*de victu*).

It is not entirely clear whether Apuleius intended the topics he mentions (reproduction, manner of living, animal parts, and differentiating characteristics) to line up with the Aristotle-titles that follow, as he may be claiming that these topics were covered by all four Peripatetics (and so by Theophrastus, Eudemus, and Lyco as well), but he might have.¹⁰ There are a couple of pretty clear matches: generation and *περὶ ζώων γενέσεως*, differentiating characteristics and *περὶ ζώων ιστορίας*. The latter includes manner of living as well, and the lost work on dissections might be intended as a match with the reference to the parts of animals (though Aristotle's *De partibus animalium*, not mentioned by Apuleius, would be a better match).¹¹

¹⁰ On Theophrastus on animals see R. W. Sharples, *Theophrastus of Eresus. Sources for His Life, Writings, Thought and Influence. Commentary V Sources of Biology (Human Physiology, Living Creatures, Botany)* (Leiden 1995) 32–123. On Theophrastus' *De piscibus* see R. W. Sharples, "Theophrastus: *On Fish*," in W. W. Fortenbaugh et al. (eds.), *Theophrastus: His Psychological, Doxographical, and Scientific Writings* (New Brunswick 1992) 347–361, and R. Mayhew, "Pseudo-Aristotle, *De mirabilibus auscultationibus* 71–74 and Theophrastus' *De piscibus*," in A. Zucker et al. (eds.), *The Aristotelian Mirabilia and Peripatetic Natural Science* (New York 2024). In *Apol.* 41.6 Apuleius mentions having read Theophrastus' (now lost) *Περὶ δακετῶν καὶ βλητικῶν* (*On [Animals] that Bite and Sting*), on which work see A. Zucker, "Théophraste à mots découverts: sur les animaux qui mordent ou piquent selon Priscien," in D. Auger et al. (eds.), *Culture classique et christianisme. Mélanges offerts à Jean Bouffartigue* (Paris 2008) 341–350, and G. Verhasselt, "Pseudo-Aristotle's *De mirabilibus auscultationibus* 139–151: Theophrastus' *On Animals that Bite and Sting* and Aristotle's *Nomima Barbarica*," in *The Aristotelian Mirabilia*. On Eudemus on animals see S. A. White, "Eudemus the Naturalist," in W. W. Fortenbaugh et al. (eds.), *Eudemus of Rhodes* (New Brunswick 2002). As for Lyco, P. Stork, "Lyco of Troas: The Sources, Text and Translation," in W. W. Fortenbaugh et al. (eds.), *Lyco of Troas and Hieronymus of Rhodes: Text, Translation, and Discussion* (New Brunswick 2004) 56, places *Apol.* 36 (F 15) under *Dubious*.

¹¹ H. E. Butler and A. S. Owen, *Apulei apologia sive Pro se de magia liber* (Oxford 1914) 88, take *plurimos libros de genitu animalium* etc. to refer to "the *Historia animalium*, *de generatione animalium*, *de partibus animalium*, *de incessu animalium*, and the lost work on anatomy." I think White, *Eudemus of Rhodes* 210, is more accurate: "His summary descriptions in the preceding lines not only evoke

Before continuing, I want to discuss a possible problem with the text, specifically *περὶ ζώων ἀνατομῆς*, a title found nowhere else (attributed to no other author). According to Helm (*Apulei Platonici*, app. crit. ad loc.), *Laurentianus plut.* 68.2, the primary manuscript for the *Apologia*, has “*ΠΕΡΙ ΖΩΩΝ ΓΕΝΕΣΕΩΣ (sic) ΠΕΡΙ ΖΩΩΝ ΑΝΑΤΟΜΩΝ*,” so *something* has gone wrong with the text as it comes down to us. I suggest that *περὶ ζώων ἀνατομοίς* (n.b.: -οίς is impossible) may not be one title but rather an error for either pair of these titles: *περὶ ζώων, ἀνατομῶν* or *περὶ ζώων, περὶ ἀνατομῶν*. There are other possibilities;¹² but I favor these two, because in the lists of Aristotle’s works in two ancient biographies of him, the title appears as *Ἀνατομῶν* and *Περὶ ἀνατομῶν*.¹³ And of the two, I favor *περὶ ζώων, ἀνατομῶν*, as it is the closest to *περὶ ζώων ἀνατομοίς*. This suggestion gets further support from *Apol.* 40.5, where Apuleius refers to the work as *libros ἀνατομῶν Aristotelī*.¹⁴ If I am right, then *περὶ ζώων* would refer to another work on animals besides *περὶ ζώων ἱστορίας*, and the most likely explanations would be that this is a reference to the *Zoika*¹⁵ or to

the modern titles for two works (*de genitu* for *De generatione, de particulis* for *De partibus*); they also specify both the three main topics of *HA* (reproduction, habitat and behavior, morphology: *HA* 5–6, 8–9 [i.e. 7–8], 1–4) and the focus of the work as a whole (*de omni differentia*).¹⁶

¹² *ἀνατομαί* in place of *ἀνατομῶν* or *περὶ ἀνατομῶν* is another possibility, as is *περὶ ζώων μορίων* in place of *περὶ ζώων*.

¹³ *Ἀνατομῶν α΄ β΄ γ΄ δ΄ ε΄ ζ΄* (Diog. Laert. 5.25), *Περὶ ἀνατομῶν ζ΄* (Hesychius). In both lists, the title is immediately followed by a related title: *Ἐκλογή ἀνατομῶν α΄*. On the nature of the *Ἀνατομῶν*, and on Aristotle on dissection more generally, see O. Hellmann, “‘Multimedia’ im Lykeion? Zu Funktionen der Anatomai in der aristotelischen Biologie,” *Antike Naturwissenschaft und ihre Rezeption* 14 (2004) 65–86, and C. Bubb, *Dissection in Classical Antiquity: A Social and Medical History* (Cambridge 2022) 26–33 and 183–193.

¹⁴ The best argument for reading *περὶ ζώων ἀνατομῆς* with the editors of Apuleius is a stylistic one: he desired to refer to each of the three works as *περὶ ζώων ... (γένεσεως, ἀνατομῆς, ἱστορίας)*.

¹⁵ Mayhew, in *Revisiting Aristotle’s Fragments* 120–121 and 134–136, shows

a later compilation of Peripatetic material on animals (for instance, the *Epitome of Aristotle's On Animals* by Aristophanes of Byzantium, part of which survives in the Byzantine *Sylloge de historia animalium*; more on this work below).¹⁶ In what follows, however, not much hangs on this speculation.

There is other evidence that the Ζοϊκα was among the books Apuleius possessed. In *Apol.* 36.8, he addresses a servant of the court:

Prome tu librum e Graecis meis, quos forte hic amici habuere sed utique¹⁷ naturalium quaestionum atque eum maxime, in quo plura de piscium genere tractata sunt.

You, bring forth one of my Greek books, which my friends might happen to have here—especially one of my *Natural Questions*¹⁸—and in particular the one in which more was said about the genus of fish.

It is natural to take this to refer to books written by Apuleius in Greek. But I think it possible that this is a reference specifically to those Greek books that he used to produce collections of excerpts and/or that he translated into Latin, having supplemented the original Greek source with other material, as suggested in *Apol.* 38.2–3¹⁹ (addressing Maximus):

that in Athenaeus, Περὶ ζῴων is sometimes used to refer to the Ζοϊκα (more often in fact than it is used for the *Historia animalium*).

¹⁶ On this work see O. Hellmann, “Peripatetic Biology and the *Epitome* of Aristophanes of Byzantium,” in W. W. Fortenbaugh and S. White, *Aristo of Ceos. Text, Translation and Discussion* (New Brunswick 2006). Rose³ 215 considered the *Epitome of Aristotle's Historia animalium* and Ζοϊκα the same work. Against this view see A. Zucker, “Proof with Peacock: Reappraising the Relationship between Ζοϊκα and Aristophanes' *Epitome*,” in K. Epstein and G. Verhasselt (eds.), *Der fragmentierte Aristoteles* (Berlin forthcoming). See n.30 below.

¹⁷ With Jones, *Apuleius: Apologia*, I accept Lipsius' *sed utique* over the manuscripts' *sedulique*.

¹⁸ On *naturalium quaestionum* see Harrison, *Apuleius* 29–30.

¹⁹ Shortly after referring to Aristotle's *περὶ ζῴων γενέσεως, περὶ ζῴων ἀνατομῆς, περὶ ζῴων ἱστορίας* (in the passage quoted above), Apuleius writes

Et memento de solis piscibus haec volumina a me conscripta, qui eorum coitu progignantur, qui ex limo coalescant, quotiens et quid anni cuiusque eorum generis feminae subent, mares suriant, quibus membris et causis discreti natura viviparos eorum et oviparos—ita enim Latine appello quae Graeci ζωοτόκα et ὠοτόκα (etc.)

Remember too that these volumes of mine concern fish only: which are produced from coitus, and which congeal from mud;²⁰ how often and at what time of year the female of each species is in heat, and the male is aroused; by what organs and causes nature distinguishes the viviparous and the oviparous—for that is what I call in Latin what the Greeks call ζωοτόκα and ὠοτόκα (etc.)²¹

It is noteworthy that ζωοτόκα and ὠοτόκα are standard terminology, and a standard distinction, in Aristotle's extant biological works.²² And it is also significant that Athenaeus' *Deipnosophistae* 7 (which is devoted entirely to fish and other aquatic animals) is the source of most of the fragments from the *Zoika*. Over seventy times Athenaeus refers to what Aristotle said about various kinds of fish. Many of these are probable or certain references to the *Historia animalium*, but sixteen others are explicit references to the *Zoika* and/or *On Fish* (Περὶ ἰχθύων), in some version of the title and/or subtitle.²³ Perhaps *On Fish* was the title

(36.6): *ordinatius et cohibilius eadem Graece et Latine adnitar conscribere et in omnibus aut omissa adquirere aut defecta supplere* ("I struggle to write the same things in Greek and Latin more systematically and concisely, and in all these works to add what has been omitted or replace what is defective"). So it may be that distinguishing books written by Apuleius in Greek and these works of Aristotle is not as straightforward as one might think.

²⁰ The latter referring to spontaneous generation.

²¹ Hunink, *Apuleius of Madauros* II 117, on 38.3 (*viviparos* and *oviparos*): "Apuleius appears indeed to have coined the Latin terms for Greek ζωοτόκα and ὠοτόκα, as used in Aristotle."

²² See e.g. the index in D. M. Balme, *Aristotle: Historia Animalium* I (Cambridge 2002) s.vv. ζωοτόκα and ὠοτόκα.

²³ Περὶ ζῳϊκῶν (9 times: 300F, 305C, 313D, 315E, 318E, 319C, 327F, 328F, 330A). The following each appear once: Ζῳικὰ ἢ Περὶ ἰχθύων (286F), Περὶ

or label given to one book of the Ζοῖκα (a separate papyrus scroll), and that was one of the Aristotelian works that Apuleius translated and supplemented.²⁴

I have argued elsewhere that a passage from Athenaeus' long discussion of eels (297C–300D) contained a fragment from either the Ζοῖκα or the *Homeric Problems*.²⁵ But I think *Apol.* 38.2–3 tips the balance in favor of the Ζοῖκα, and in fact find *Apol.* 38.2–3 and Athenaeus 298C–D mutually reinforcing:²⁶

ἐν ἄλλοις δὲ πάλιν ὁ Ἀριστοτέλης ἱστορεῖ γίνεσθαι αὐτὰς οὔτε
 ὄτοκουσας οὔτε ζωτοκούσας ἀλλ' οὐδὲ ἐξ ὀχείας, ἀλλ' ἐν τῷ
 βορβόρῳ καὶ τῇ ἰλύϊ σήψεως γινομένης.

In another work again, Aristotle reports that they come to be not from copulation—neither bearing eggs nor bearing live young—but when decomposition occurs in the mire and sediment.

Here we find cognates of ὄτοκόα and ζωτοκόα, as well as a reference to spontaneous generation in mud, just as in *Apol.* 38.

A bit later, Apuleius writes (38.5):

Pauca etiam de Latinis scriptis meis ad eandem peritiam pertinentibus legi iubebo, in quibus animadvertes cum res²⁷ cognitu raras, tum nomina etiam Romanis inusitata et in hodiernum quod sciam infecta, ea tamen nomina labore meo et studio ita de Graecis provenire, ut tamen Latina moneta percussa sint.

ἰχθύων (303D), Περὶ [ζωϊκῶν] ζῴων ἢ Περὶ ἰχθύων (305F), Περὶ ζωϊκῶν καὶ ἰχθύων (318B), Περὶ ζωϊκῶν ἢ ἰχθύων (319D), Περὶ ἰχθύων (ἢ) ζωϊκῶν (320E), Περὶ ζῴων καὶ ἰχθύων (328D). I use the edition of S. D. Olson, *Athenaeus Naucratis Deipnosophistae* II.A (Berlin 2021) (but on Περὶ [ζωϊκῶν] ζῴων ἢ Περὶ ἰχθύων see n.37 below).

²⁴ Hunink, *Apuleius of Madauros* II 115, on *Apol.* 36.5: “In addition to the three works named here, Apuleius may also have known Aristotle’s book ‘On fish’, now also lost; cf. Fr. 294ff (Rose).”

²⁵ R. Mayhew, “Aristotle on Homer on Eels and Fish in *Iliad* 21,” *CQ* 70 (2020) 639–649.

²⁶ Athen. 298B–D ≈ F 311 Rose³/198 Gigon.

²⁷ With Hunink, *Apuleius of Madauros* I (ad loc.), I accept Bosscha’s correction *res* over Helm’s *me* <*morabiles res et*> for the manuscripts’ *me* (see Helm, *Apulei Platonici*, app. crit. ad loc.).

I will order a few of my Latin writings be read dealing with the same science, in which you will notice things rarely known, and also names unfamiliar even to the Romans and never coined before to my knowledge. But thanks to my effort and study those names have been obtained from the Greek, so that they are nonetheless of Latin mintage.

He says he will discuss aquatic animals alone, mentioning others only by way of contrast.²⁸

Apuleius then lists what he says might seem to his accuser to be the language of Egyptian or Babylonian magic (*magica nomina Aegyptio vel Babylonico ritu*), though they are in fact Greek terms that he has translated into Latin (38.7–9): σελάχεια (cartilaginous fish), μαλάκεια (soft-bodied animals, i.e. cephalopods), μαλακόστρακα (soft-shelled animals, i.e. crustaceans), χονδράκανθα (cartilage-spined, a characteristic of σελάχεια), ὀστρακόδερμα (hard-shelled animals, e.g. oysters), καρχαρόδοντα (saw-toothed animals, e.g. bonitos),²⁹ ἀμφίβια (amphibious), λεπιδωτά (with scales, referring to fish), φολιδωτά (with scales, referring to reptiles), δερμόπτερα (with skin-like wings, referring to bats), στεγανόποδα (web-footed, referring to certain water birds), μονήρη (solitary), and συναγελαστικά (gregarious, travelling in shoals). He adds that these do not exhaust the list (*possum etiam pergere*).

Apuleius' main source here seems to be the *Epitome of Aristotle's On Animals* of Aristophanes of Byzantium (3rd cent. B.C.), unless some other source is responsible for the opening of the extant *Sylloge de historia animalium* 1.1 (p.1.12–20 Lambros):³⁰

²⁸ *Apol.* 38.6: *De solis aquatilibus dicam nec cetera animalia nisi in communibus differentis attingam.*

²⁹ This is also used to describe lobster claws (*HA* 4.2, 526a19).

³⁰ Or unless Apuleius and Aristophanes had a common source. There is no standard scholarly way of referring to the Συλλογή τῆς περὶ ζώων ἱστορίας compiled for Constantine VII (10th cent.), one major source of which is Ἀριστοφάνους τῶν Ἀριστοτέλους περὶ ζώων ἐπιτομή. I refer to it as *Sylloge de historia animalium* (or *Sylloge* for short).

Ταῦτά ἐστιν ἐν τῇ νῦν γραφομένη ὑφ' ἡμῶν συντάξει ἃ δεήσει σε ἐπιγνῶναι, τίνα λέγει ὁ Ἀριστοτέλης ἐν τῇ Περὶ ζῴων πραγματεία σελάχια ζῴα καὶ τίνα μαλάκια, ὁμοίως δὲ καὶ τίνα μαλακόστρακα κατονομάζει καὶ τίνα ὀστρακόδερμα, ποῖά τε λέγει τῶν ζῴων καρχαρόδοντα καὶ τίνα χαυλιόδοντα καὶ ἀμφόδοντα καὶ συνόδοντα, ποῖά τε ἔντομα πέφυκε καὶ τίνα ἐστὶν ἀμφίβια καὶ λεπιδωτά καὶ φολιδωτά, καὶ ποῖα μόνυχα καὶ διχηλά καὶ πολυσχιδῆ καὶ στεγανόποδα καὶ δερμόπτερα καὶ κολεόπτερα καὶ πτιλωτά καὶ πτερωτά καὶ γαμψώνυχα καὶ λοφοῦρα.³¹

This information in the collection written by us is what you will have to get to know: what Aristotle means in his treatise *On Animals* when he names some animals σελάχια or μαλάκια, and similarly μαλακόστρακα or ὀστρακόδερμα; and what are the animals that he calls καρχαρόδοντα and χαυλιόδοντα and ἀμφόδοντα and συνόδοντα; and what animals are by nature ἔντομα, and which are ἀμφίβια and λεπιδωτά and φολιδωτά; and what animals are μόνυχα and διχηλά and πολυσχιδῆ and στεγανόποδα and δερμόπτερα and κολεόπτερα and πτιλωτά and πτερωτά and γαμψώνυχα and λοφοῦρα.³²

Ten of the thirteen terms Apuleius mentions are included in this passage from the *Sylloge*, mostly in the same order. Three are not (χονδράκανθα, μονήρη, συναγελαστικά); but two of these (μονήρη and συναγελαστικά) appear together twice later in the *Sylloge*.³³ The dozen terms in the *Sylloge* not mentioned by Apuleius are all inapplicable to aquatic animals: χαυλιόδοντα (with tusks), ἀμφόδοντα (with two rows of teeth), συνόδοντα (with joined teeth),

³¹ I accept the conjecture λοφοῦρα of A. Zucker, *Sylloge Zoologique de Constantin* (Paris forthcoming), over the manuscripts' ὀλόσφυρα. He comments: "il s'agit sans doute d'une erreur de graphie pour λοφοῦρα (cf. ὀλόσφυρα Pg). Beaucoup d'autres termes classificatoires sont mal orthographiés." He goes on to provides a number of examples. (I am grateful to Arnaud Zucker for making available to me, prior to its publication, his translation of this work.)

³² Cf. Aelian *NA* 11.37 (= F 281 Rose³), though Aelian does not mention Aristotle's name.

³³ *Sylloge*. 1.25 (p.5.12–15 Lambros) and 2.37 (p.42.17–18). In the latter, they appear together with both ἀμφίβια and ἐπαμφοτερίζειν: "Ἔστι δὲ ὁ ἄνθρωπος καὶ μονήρης καὶ συναγελαστικός· ἐπαμφοτερίζειν γὰρ δύναται. λέγει δ' ἂν τις καὶ αὐτὸν ἀμφίβιον εἶναι. (On ἐπαμφοτερίζειν see n.40 below.)

ἔντομα (insects), μώνυχα (single-hooved), διχηλά (cloven-hooved), πολυσχιδή (many-splits, i.e. with toes), κολεόπτερα (sheath-winged, said of beetles), πτιλωτά (membrane-winged, e.g. flies), περωτά (winged, with feathers), γαμψώνυχα (with crooked talons), and λοφοῦρα (with a mane, said of equine animals).

The one word mentioned by Apuleius but not in the *Sylloge* is χονδράκανθα. Like most of the terms Apuleius mentions, this one can be found in the extant works of Aristotle (including in the *Historia animalium*).³⁴ The others are: τὰ σέλαχη, μαλάκια, μαλακόστρακα, ὄστρακόδερμα, καρχαρόδοντα, λεπιδωτά, φολιδωτά, δερμόπτερα, στεγανόποδα.³⁵

Three of these terms (σέλαχη, μαλάκια, καρχαρόδοντα) also appear in passages attributed to Aristotle's *Zoika* (all from Athenaeus 7, on aquatic animals):

ἐν δὲ τῷ Περὶ ζωϊκῶν, σελάχη, φησί, βοῦς, τρυγών, νάρκη, βατίς, βάτραχος, (...) βούγλωτος, ψήττα, μῦς. (330A)

In his *On Zoika*, he claims that *selachia* are: horned-ray, sting-ray, electric ray, skate, (...) angler, sole, flounder, mouse-fish.³⁶

ἐν δὲ τῷ Περὶ ζωϊκῶν Ἀριστοτέλης μαλάκιά φησιν εἶναι πουλύποδας, ὀσμύλην, ἑλεδώνην, σηπίαν, τευθίδα. (318E)

In his *On Zoika*, Aristotle claims that the *soft-bodied animals* are octopuses, osmulê, heledônê, cuttlefish, and squid.

Ἀριστοτέλης ἐν τῷ Περὶ [ζωικῶν] ζῶων ἢ Περὶ Ἰχθύων,³⁷ ὁ

³⁴ Again see e.g. the index in Balme, *Aristotle: Historia Animalium* s.vv.

³⁵ Aristotle contrasts στεγανόποδα with σχιζόπους (split-footed). Judging by the evidence in Athenaeus 9, however, σχιδανόπους, not σχιζόπους, was the preferred term in *Zoika*; see R. Mayhew, "Evidence for Aristotle's Lost *Zoika* in Athenaeus' *Deipnosophistae* 9," in *Der fragmentierte Aristoteles* (forthcoming).

³⁶ The last three fish are not *selachia*. A. Andrews, "Greek and Latin Mouse-Fishes and Pig-Fishes," *TAPA* 79 (1948) 233, argues, on these grounds: "It can therefore safely be assumed that something has dropped out after βάτραχος in this mutilated passage and that originally the last three fish were not characterized as selachians." I have therefore inserted a lacuna.

³⁷ Olson, *Athenaeus* 433, prints Περὶ ζωικῶν ζῶων ἢ Περὶ ἰχθύων, but that cannot be right. One must delete either ζωικῶν or ζῶων, and as our epitome of Athenaeus' *Deipnosophistae* omits ζωικῶν I bracket that.

κίθαρος, φησί, καρχαρόδους, μονήρης, φυκοφάγος, τὴν γλῶτταν ἀπολελυμένος, καρδίαν λευκὴν ἔχων καὶ πλατεῖαν. (305F)

Aristotle in his *On Animals or On Fish* claims that the kitharos is *saw-toothed, solitary*, feeds on seaweed, has a detached tongue, and has a heart white and flat.

Three other terms (μονήρη, συναγελαστικά, ἀμφίβια) appear in Ζοῖκα-fragments and in the *Sylloge* but not in Aristotle's extant works. First the related pair: μονήρη appears in four fragments from Athenaeus 7, for instance in 305F (just quoted);³⁸ and συναγελαστικά appears twice in Ζοῖκα-fragments, one of them discussed below and significant in the present context (315E).³⁹ As for ἀμφίβια, it appears in a passage that I have argued elsewhere likely comes from the Ζοῖκα, though a title is not mentioned (306B–C):

Κορδύλος, τοῦτον Ἀριστοτέλης φησὶν ἀμφίβιον εἶναι καὶ τελευτᾶν ὑπὸ τοῦ ἡλίου ἀυανθέντα.

Kordulos. Aristotle states that this is *amphibious* and dies when it is dried by the sun.⁴⁰

It has been argued that the difference in terminology between the *Historia animalium* and the Ζοῖκα shows that the Ζοῖκα was not by Aristotle. But I do not think that follows, especially if the Ζοῖκα

³⁸ See also Athen. 301C, 321D–E, and 327C. In extant works, Aristotle prefers μοναδικός: see *HA* 1.1, 487b33–488a14 and 8(9).40, 623b10.

³⁹ See also Athen. 310E. Aristotle prefers ἀγελαῖα to συναγελαστική: see *HA* 1.1, 487b33–488a14 (contrasted with μοναδικός) and 8(9).2, 610b1–14—this latter on fish, in which he also uses συναγελάζομαι, a verb cognate to συναγελαστική.

⁴⁰ The *kordulos* is generally held to be some kind of salamander or newt (or the larvae of such), and I assume that is correct. See e.g. S. Zierlein, *Aristoteles. Historia Animalium Buch I und II* (Berlin 2013) 140–141, and Lennox, *Aristotle on Inquiry* 280 n.26. In *Revisiting Aristotle's Fragments* 116–117, I argued that Athen. 306B–C is likely not a fragment from the Ζοῖκα, but in *The Aristotelian Mirabilia* 189–191, I make the case that it probably is. Another possible fragment with ἀμφίβια is Athen. 353F. Theophrastus uses ἀμφίβια in *Pisc.* 12 and *Hist.pl.* 1.4.3. In his extant works, Aristotle uses the verb ἐπαμφοτερίζειν to refer to animals that 'tend to both ways' of life, i.e., on land and sea (see e.g. *HA* 7(8).2, 589a20–22).

was (as I believe) a notebook from the collection-of-data stage of biological inquiry, compiled under his direction but in collaboration with others in the Lyceum.⁴¹

In *Apol.* 40.5, Apuleius changes the (ichthyological) subject from his general knowledge (including relevant terminology) of a wide variety of fish, to his actual dissection of them:

“At enim,” inquit, “piscem cui rei nisi malae proscidisti, quem tibi Themison seruus attulit?” Quasi vero non paulo prius dixerim me de particulis omnium animalium, de situ earum deque numero deque causa conscribere ac libros ἀνατομῶν Aristotelī et explorare studio et augere.

“But,” he says, “for what purpose, if not an evil one, did you dissect the fish brought to you by your slave Themison?” As if I had not said a little while ago that I write about [even] the small parts of all animals—about their location, number, and purpose—and that I studiously investigate and add to the books [called] *Dissections* by Aristotle.

As an example of his originality—and presumably of how he supplements Aristotle—Apuleius describes a small aquatic animal (called a sea hare, *leporem marinum*),⁴² which neither Aristotle nor any other ancient philosopher had knowledge of (40.8–10). He then adds (40.11):

Quod Aristoteles numquam⁴³ profecto omisisset scripto prodere, qui aselli piscis solius omnium in medio alvo corculum situm pro maximo memoravit.

Aristotle would certainly never have failed to convey this in writing [sc. had he known of it], he who mentions as quite important that the ‘donkey’ alone of all fish⁴⁴ has its heart located in the middle of the stomach.

⁴¹ See Mayhew, in *Revisiting Aristotle’s Fragments* 136–138.

⁴² This could be any of a number of species in the genus *Aplysia*, which consists of large sea slugs. See Butler and Owen, *Apulei apologia* 98, for details; they claim that “Apuleius’ description is sufficiently accurate.”

⁴³ With Butler and Owen, *Apulei apologia* 98–99, I accept Goldbacher’s correction *numquam* for the manuscripts’ *si unquam*; Helm, *Apulei Platonici* 47, prints *si* (<*scisset n*)*umquam*.

⁴⁴ *aselli*, from *asellus*, the diminutive of *asinus* (‘ass’ or ‘donkey’), can refer to

This is comparable to Athenaeus 315E, and to three other texts from roughly the same period:⁴⁵

ὄνος, φησὶν Ἀριστοτέλης ἐν τῷ Περὶ ζῳϊκῶν, ἔχει στόμα ἀνερρωγὸς ὁμοίως τοῖς γαλεοῖς, καὶ οὐ συναγελαστικός. καὶ μόνος οὗτος ἰχθύων τὴν καρδίαν ἐν τῇ κοιλίᾳ ἔχει καὶ ἐν τῷ ἐγκεφάλῳ λίθους ἐμφερεῖς μύλαις.

The donkey (fish),⁴⁶ Aristotle claims in the *On Zoika*, has a widely gaping mouth, like the *galeos* (a small shark), and is not gregarious. Moreover, this is the only fish to have the heart in its stomach, and in its brain there are stones resembling millstones.

Clement of Alexandria confirms that according to Aristotle the donkey fish is the only fish that has its heart in its stomach (*Paed.* 2.1.18):

τῷ ἰχθύϊ τῷ καλουμένῳ ὄνῳ τὰ μάλιστα ἐοικώς, ὃν δὴ φησὶν Ἀριστοτέλης μόνον τῶν ἄλλων ζῳῶν ἐν τῇ γαστρὶ τὴν καρδίαν ἔχειν.

very much like the fish called donkey, which, Aristotle claims, alone of all other animals, has its heart in its belly.

Aelian repeats this claim in *NA* 5.20 (referring to ‘the sea donkey’, ὄνος ὁ θαλάττιος), while in 6.30 he claims ‘the donkey fish’ (ὁ ἰχθὺς ὁ ὄνος) has its heart in its belly, and also that it is solitary and has stones like millstones in its brain, as Athenaeus claims. But neither text mentions Aristotle.

a fish (cf. ὄνος). See Butler and Owen, *Apulei apologia* 99, and Hunink, *Apuleius of Madauros* II 124, and n.46 below. (I expect ‘donkey fish’ is less open to misunderstanding than ‘ass fish’.)

⁴⁵ All of the relevant authors are from the Roman Imperial period (from the second and third centuries A.D.), their dates overlapping somewhat: Apuleius is the earliest (ca. 125 to 170), then Clement of Alexandria (ca. 150 to 211/216), and then Aelian (165/170 to 230/235). With Athenaeus, we can merely say that he flourished around 200. It is difficult, if not impossible, to determine any direction of influence.

⁴⁶ The primary meaning of ὄνος is ‘ass’ and ‘donkey’. But as D. W. Thompson, *A Glossary of Greek Fishes* (London 1947) 182, writes of the ὄνος: “A fish of the Cod family, especially the Hake.” It is noteworthy that the *fish* called ὄνος never appears in the *Sylloge de historia animalium* (though the equine mammal with that name does).

These two passages, from Apuleius and Athenaeus, might lead one to equate the *Zoika* and the *Dissections*. I find that unlikely, however, given the differences in the other fragments for each work and the fact that most *Zoika*-fragments do not report on the internal organs of animals or features of the parts of animals requiring dissection.⁴⁷ I think a much more likely explanation is that the *Zoika* (a notebook collection of data about animals, organized according to kind) sometimes made use of Aristotle's findings in his *Dissections*—noting rare features, for instance—although information that can be gained only through dissection does not seem to have been a main concern of the *Zoika*.

In conclusion, I think the best explanation of the passages from *Pro se de magia* (*Apologia*) that I have discussed is that Apuleius read a number of Aristotle's biological works—not only (some of) the extant ones, but also the lost *Zoika* and *Dissections* (as well as the *Epitome of Aristotle's On Animals* by Aristophanes of Byzantium)—that he had a special interest in fish, and translated the relevant passages, supplementing them with his own observations, additions, and corrections.⁴⁸ In doing so, he created a Latin compilation on fish.⁴⁹ In any case, I think it quite possible that two

⁴⁷ See n.5 above. In addition, based on the references to the *Dissections* in Aristotle's extant works, it is very likely that the *Dissections* included diagrams, whereas there is no reason to think the *Zoika* did. (I am grateful to the journal's referee for this point.)

⁴⁸ See n.19 above.

⁴⁹ Perhaps Apuleius translated and expanded some of Aristotle's works on animals, and the results have roughly the same relationship to the original that his extant *De mundo* has to the Greek pseudo-Aristotle, Περὶ κόσμου. Hunink, *Apuleius of Madauros* II 115, commenting on *Apol.* 36.6, writes: “*imitatio* and *aemulatio* are combined: the authority of the philosophers is presented as a valid precedent, but the speaker has also added something of his own. His achievement, so he claims, is threefold: he has systemized and summarized their results, he has written about them in both Greek and Latin, and he has made some additions and corrections.” On Apuleius as a translator of Greek philosophical texts, see (inter alia) R. Fletcher, “Platonizing Latin: Apuleius's *Phaedo*,” in G. D. Williams et al. (eds.), *Roman Reflections*:

of the texts that I have discussed are 'fragments' from the Ζοϊκα: *Apol.* 40.11, on the hake, which, in editing a collection of Ζοϊκα-fragments, I plan to present alongside Athenaeus 315E; and (with a bit less confidence) *Apol.* 38.2–3, on the spontaneous generation of eels, which I plan to present alongside Athenaeus 298C–D.⁵⁰

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Department of Philosophy
Seton Hall University
South Orange, NJ 07079
robert.mayhew@shu.edu

Studies in Latin Philosophy (Oxford 2015); T. Slabon, "Et cum sit unus, pluribus nominibus cietur: Apuleius' Latin Additions to Greek Theology," and M. Watton, "Reading *de Mundo*: Didactic, Polemic, Appropriation," both in G. Boys-Stones (ed.), *Apuleius on the Cosmos* (Oxford forthcoming). And note the following, from the same volume, G. Boys-Stones, "Apuleius on the Cosmos: Introduction": "it has been calculated that the Latin text [of *De mundo*] translates only four-fifths of the Greek, yet expands the rest so much that it is almost one-and-a-half times as long (Müller 1939, esp. 133)." This last reference is to S. Müller, *Das Verhältnis von Apuleius De mundo zu seiner Vorlage* (Leipzig 1939). (I am grateful to George Boys-Stones for making available to me, prior to its publication, material from *Apuleius on the Cosmos*.)

⁵⁰ I would like to thank Gertjan Verhasselt, for his comments on an earlier draft of this essay, and Claire Bubb, for sharing with me her unpublished paper "The Roman Resurgence of Aristotle's Biology."