

links.¹⁰ He snatched up the groom,¹¹ fed him to the beasts to distract them—a sound cracked through the rending bones¹²—and while ‘one was carrying off a leg, one a forearm, another in her teeth the head by the root of the neck’,¹³ Herakles broke off the chain and drove the horses away.

The rending of the groom’s body which Pindar blood-chillingly describes is known from two Attic vases.¹⁴ One, a fragmentary red-figure cup in Florence¹⁵ by Oltos, features Herakles on one side, threatening a horse with his club while grasping its muzzle with his left hand, and Diomedes on the other side. Beazley published the cup in 1933¹⁶ and listed the few vases on which Herakles and the horses of Diomedes are represented, but he did not mention the human arm which hangs, eaten at the fore-arm, from the horse’s mouth, nor do the other examples which he cites clearly depict man-eating horses.

The second vase on which the horse is unquestionably man-eating is an even more graphic illustration of Pindar’s story—the black-figure cup in Leningrad¹⁷ by Oltos’ slightly older contemporary, Psiax.¹⁸ The vase is exceptionally fine and technically unusual, in that the black figures are painted on specially prepared coral red ground.¹⁹ In the tondo of the cup, Herakles, dressed in a lion-skin and wielding a club,²⁰ stands in front of one of the horses of Diomedes, collaring it with his left arm.²¹ From the mouth of

the horse hangs the head, shoulder and arm of a man, covered with blood—the groom whose head one of the beasts carried off ‘in her teeth, by the root of the neck’. The vase is a work of the last decade or so of the sixth century; it was probably painted before Pindar was born, certainly before he wrote this poem. It is, therefore, our earliest evidence for Herakles and the horses of Diomedes.

Before Pindar’s new poem came to light, the identity of the dismembered figure on the vases was unknown—indeed virtually unrecognised (Psiax’ diminutive figure has, to my knowledge, not previously been noticed). Later writers had left us conflicting accounts: Apollodoros said Herakles fed the horses Abderus and then founded Abdera in his memory (ii 5.8); Diodorus Siculus (iv 15.3 f.) said that Diomedes was fed to the very horses he had taught the loathsome habit (although Oltos’ vase makes this unlikely, since Diomedes himself appears on the other side of the cup, entreating Herakles to return his specially trained horses). Psiax’ little dismembered man is surely the groom whom Herakles found by night in the stables: painter and poet draw on a common theme,²² known long before the sculptors at Olympia carved their metope or Euripides wrote his plays. Together they give us our earliest evidence—pictorial and literary—for Herakles’ encounter with the man-eating horses of Diomedes.

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¹⁰ *HSCP* lxxvi, 52; *Oxy. Pap.* xxvi, 150 (ll. 22 ff.).

¹¹ *Oxy. Pap.* xxvi, 150 (l. 15).

¹² *HSCP* lxxii, 74 f.; lxxvi, 52.

¹³ *HSCP* lxxii, 78 f. See also *Maia* n.s. xvi (1964), 311 ff. (Pavese’s description of the Oltos cup).

¹⁴ When Herakles appears with a horse (cf. *Vasenlisten*³, 186 ff.) the artist may not always have had the horses of Diomedes in mind (cf. Pfuhl, *MZ* 323, para. 337).

¹⁵ Florence, I B 32, *frr. ARV* 58, no. 47. *CV* i, pl. I. B 32.

¹⁶ *Campana Fragments* (1933), 8 and pl. Y, 3.

¹⁷ Once Odessa, now Leningrad. *ABV* 294, no. 22. *Para.* 128. The diameter of the cup is 22.5 cm. Mme K. S. Gorbunova supplied the photographs and measurement.

¹⁸ Cf. *CF*. 8.

¹⁹ L. Talcott and B. Sparkes, *Agora* xii, 18 ff.

²⁰ As Pavese has noted (*HSCP* lxxii, 78), in art Herakles wields his club, not so much to harm the beasts as to threaten them into obedience. The text of the Pindar fragment is not clear at line 29 (cf. *Oxy. Pap.* xxvi, 151). Pavese reads *τεῖρε δὲ στελεῶν*—‘stung them with his club’ (*HSCP* lxxii, 77 f.), but Lloyd-Jones (*HSCP* lxxvi, 52) has pointed out that this conjecture is impossible, and suggests, with Lobel (*Oxy. Pap.* xxvi, 151, l. 24), that something has dropped out of the text. In art Herakles may wield the club because it is one of the attributes by which he is most easily recognised, but Pavese’s notion of how Herakles dominated the animals seems to me reasonable, indeed very likely, in view of the Psiax cup: here Herakles, dressed in his lionskin, is in need of no other attribute for easy identification.

²¹ Herakles grapples with one of the horses on a white ground lekythos with black-figure decoration in Syracuse (14569) by the Marathon Painter (*ABL* 222, no. 22; *ABV* 487; Boardman, *BF Handbook*, fig. 257) of the years around 490 B.C. Here there are four horses, and their

special character is indicated not by dismembered human bodies, but by the presence of wings. This is the sort of detail which the Marathon Painter would have liked (because it gave him yet another opportunity to display his interest in contrasting areas of black and white paint), but according to some version of the story the horses may have been winged, especially since they appear in this form on some Etruscan gems (cf. P. Zazoff, *Etruskische Skarabäen* (1968), 165, no. 685).

²² *HSCP* lxxii, 79.

A note on Erasistratus of Ceos

In an article entitled ‘The Career of Erasistratus of Ceos’ in *Rendiconti del Istituto Lombardo* (Classe di Lettere e Scienze Morali e Storiche, 103, 1969, pp. 518–37, abbreviated as *RL*) and more briefly in his three-volume work on *Ptolemaic Alexandria* (Oxford, Clarendon Press, 1972, Vol. 1 pp. 347 ff. and relevant notes in Vol. 2 pp. 503 ff., abbreviated as *PA I* and *PA II*), P. M. Fraser has recently re-examined the evidence concerning the life and work of the important third-century B.C. physician, anatomist and physiologist Erasistratus of Ceos. Fraser’s analysis of the testimonies for the various Chryssippi is valuable; his insistence that there are no good grounds for rejecting the story, told in several ancient writers, that Erasistratus cured King Antiochus is not misplaced, and the conclusion that

at some stage, at least, Erasistratus worked at Antioch should surely be accepted. However on two points where Fraser rejects current orthodoxies concerning Erasistratus, his arguments are dubious. First he states that 'the evidence does not suggest that he [Erasistratus] practised human anatomy'.¹ Secondly, he argues that 'the view commonly accepted at present, that Erasistratus was active as a teacher of medicine in Alexandria . . . is, if not demonstrably wrong, at least unjustified by the evidence'.² The purpose of this note is to restate the case for both orthodoxies and to rebut the arguments that Fraser has brought against them. The former point is of some importance for the history of dissection in antiquity, and the latter for the question of the extent to which other cities rivalled Alexandria as centres for anatomical research in the third century.

First on the question of whether Erasistratus practised human dissection the evidence of Celsus is explicit. Reporting the views of the Rationalist or Dogmatist sect of doctors,³ he writes: 'ergo necessarium esse incidere corpora mortuorum, eorumque viscera atque intestina scrutari; longeque optime fecisse Herophilum et Erasistratum, qui nocentes homines a regibus ex carcere acceptos vivos inciderint, considerarintque etiamnum spiritu remanente ea, quae natura ante clausisset . . .' (*De Medicina*, Proem, paras. 23-4). Fraser accepts this evidence so far as Herophilus is concerned, but believes that the inclusion of the name of Erasistratus is likely to have been a mistake.⁴ At *RL* p. 531 he points out that Tertullian (*de anima*, ch. 10) mentions Herophilus alone apropos of human vivisection.⁵ He remarks that 'it would perhaps be wrong to dismiss' Celsus' report concerning Erasistratus 'if there were no other grounds for doing so', but his analysis of the evidence in Galen leads him to conclude (*RL* p. 532) that 'Erasistratus' activity in the anatomical field remains obscure, but the evidence does not suggest that he practised human anatomy'.

¹ *RL* p. 532, cf. *PA II* note 76, p. 507: 'the claim that Erasistratus practised human anatomy seems weak'.

² *RL* p. 518, cf. p. 537 and *PA I* p. 347. Fraser cites Susemihl and Beloch as earlier authorities for his thesis.

³ Fraser is mistaken when he identifies those 'qui rationalem medicinam profitentur' (Celsus, *op. cit.*, para. 13) as the Methodists (*PA II* note 64, p. 505 and note 76, p. 507).

⁴ *PA II* note 76, p. 507 and cf. note 64, p. 505.

⁵ 'The tradition is not unanimous in including the name of Erasistratus (as it is in telling the story essentially of Herophilus). Tertullian, reproducing the views of Soranus, a well-informed witness on this point, does not refer to Erasistratus apropos of human vivisection.' Fraser sometimes writes as if it were certain that Tertullian reproduced Soranus: thus at *PA I* p. 349 he speaks of accepting 'the positive statements of Celsus and Soranus' concerning Herophilus. Yet that Soranus is Tertullian's source here is only an inference, though a very probable one, and elsewhere doxographical references in Tertullian do not always reproduce Soranus: see Waszink in his edition of the *De Anima*, Amsterdam, 1947, e.g. p. 329.

It is certainly true that we have better evidence to corroborate Celsus' report concerning Herophilus than we have for Erasistratus. Apart from the passage of Tertullian already mentioned, Galen confirms that, unlike many anatomists, Herophilus used human subjects.⁶ So far as Erasistratus is concerned, the first point to be made about the evidence of Galen is that despite his frequent criticisms of Erasistratus' physiological doctrines, he had a high regard for his work as an anatomist.⁷ He refers to Erasistratus as one of the great anatomists of the past in several passages,⁸ and speaks highly of two of his achievements in particular. First there is Erasistratus' discovery of the valves of the heart.⁹ On this question Galen says that whereas Herophilus described the membranes on the orifices of the heart carelessly (*ἀμελῶς*) Erasistratus did so precisely (*ἀκριβῶς*).¹⁰ Indeed Galen goes so far as to say that it is superfluous for him to describe those membranes, since Erasistratus had already done so sufficiently (*αὐτάρκως*).¹¹ Secondly, Galen praises Erasistratus' account of the brain. Here indeed on three occasions Galen provides important evidence concerning the development of Erasistratus' views on the origin of the nervous system and concerning the period at which he undertook his principal investigations. Thus in *On the Opinions of Hippocrates and Plato*, vii ch. 3, K V 602, for example, he remarks of Erasistratus that *ὅτε πρεσβύτης ὦν ἦδη καὶ σχολὴν ἄγων μόνοις τοῖς τῆς τέχνης θεωρήμασιν ἀκριβεστέρας ἐποιεῖτο τὰς ἀνατομὰς, ἔγνω καὶ τὴν οἶον ἐντεριώνην τῶν νεύρων ἀπ' ἐγκεφάλου περφυκκίαν*.¹² Fraser comments on this that Galen 'says that at the end of his life Erasistratus withdrew from practice and teaching to study anatomy: . . . and it is not clear that *τὰ τῆς τέχνης θεωρήματα* refers to practical dissection'.¹³ But while one might agree that that phrase by itself need not necessarily refer to dissection, the one that immediately follows, *ἀκριβεστέρας ἐποιεῖτο τὰς ἀνατομὰς*, should remove all doubt: it can only mean that he made more accurate dissections.

Galen's testimony at V 602 and elsewhere establishes that Erasistratus engaged in practical dissection, but that does not settle the question of

⁶ *On the dissection of the uterus* ch. 5, Kühn (K) II 895 Galen writes, however, of human dissection and nowhere attributes human vivisection to Herophilus.

⁷ Galen wrote a work in three books on the anatomy of Erasistratus, see K II 216 f. and XIX 13 f.

⁸ E.g. K V 650.

⁹ On precisely what is involved in attributing to Erasistratus the discovery of the valves of the heart, see the recent careful analysis of I. M. Lonie, 'The paradoxical text "On the Heart"', *Medical History*, 17, 1973, pp. 1-15 and 136-53.

¹⁰ K V 206, cf. also K V 548-50.

¹¹ K V 166.

¹² Cf. also K V 646-7 and XVIII A 86.

¹³ *PA II* note 76, p. 507, cf. *RL* p. 529, note 28 and p. 532.

whether he used human as well as animal subjects.¹⁴ Several commentators have found it hard to believe that his discovery of the valves of the heart and his account of the ventricles of the brain do not presuppose work on human subjects, and again we can confirm this from Galen. In *On the Use of Parts*, viii ch. 13, he says: 'Ερασιστράτος δέ, ὅτι μὲν ἐγκεφάλου σύγκειται ποικιλιότερον ἢ ἐπεγκρανίς, οὕτω γὰρ αὐτὴν ὀνομάζει, καλῶς ἀποφαίνεται· πολὺπλοκον δ' εἶναι φάσκων ἐπ' ἀνθρώπων μᾶλλον ἢ τῶν ἄλλων ζῶων αὐτὴν τε ταύτην καὶ σὺν αὐτῇ τὸν ἐγκέφαλον, ὅτι περιεστὶν αὐτῶν ἄνθρωπος τῷ νοεῖν, οὐκέθ' ὁμοίως ὀρθῶς μοι δοκεῖ γινώσκειν.¹⁵ And in *On the Opinions of Hippocrates and Plato*, K V 602–4, just after the text already mentioned, he quotes Erasistratus at length. The passage, one of the longest surviving fragments of Erasistratus, must be quoted extensively both to illustrate the detail of his account and for the sake of the explicit references to men and animals: ἐθεωροῦμεν δὲ καὶ τὴν φύσιν τοῦ ἐγκεφάλου, καὶ ἦν ὁ μὲν ἐγκέφαλος διμερής, καθάπερ καὶ τῶν λοιπῶν ζῶων, καὶ κοιλίαν παρὰ τῷ μήκει τῷ εἶδει κειμένην, συντέτρηνητο δ' αὐτὰ εἰς μίαν κατὰ τὴν συναφήν τῶν μερῶν. ἐκ δὲ ταύτης ἔφερον εἰς τὴν ἐπεγκρανίδα καλουμένην, καὶ ἐκεῖ ἑτέρα ἦν μικρὰ κοιλία, διεπέφρακτο δὲ ταῖς μήνιγγιν ἕκαστον τῶν μερῶν. ἢ τε γὰρ ἐπεγκρανίς διεπέφρακτο αὐτῇ καθ' ἑαυτήν, καὶ ὁ ἐγκέφαλος παραπλήσιος ὡν νήσται καὶ πολὺπλοκος, πολὺ δ' ἔτι μᾶλλον τοῦτον ἢ ἐπεγκρανίς πολλοῖς ἔλιγμοῖς καὶ ποικίλοις κατεσκευάσθη. ὥστε μαθεῖν τοῦτον τὸν θεωροῦντα, ὅτι, ὡς περ ἐπὶ τῶν λοιπῶν ζῶων, ἐλάφον τε καὶ λαγωῦ, καὶ εἴ τι ἄλλο κατὰ τὸ τρέχειν πολὺ τι τῶν λοιπῶν ζῶων ὑπεραίρει τοῖς πρὸς ταῦτα χρῆσιμοῖς, εὖ κατεσκευασμένοις μωσί τε καὶ νέουροις, οὕτω καὶ ἄνθρωπος, ἐπειδὴ τῶν λοιπῶν ζῶων πολὺ τῷ διανοεῖσθαι περιεστὶ, πολὺ τοῦτ' ἔστι πολὺπλοκον. ἦσαν δὲ καὶ ἀποφύσεις . . .

Fraser refers to these passages, but underestimates their force. At *PA II* note 76, p. 507, he writes: 'in iii 673, Gal. quotes Erasistratus on the comparative anatomy of the brain, but only to refute him.' But although Galen rejects Erasistratus' generalisation concerning the correlation between the convolutions of the brain, and intelligence, in different living creatures, he does so because he believes this is inaccurate in respect of certain animals: he accepts Erasistratus' description of the cerebrum and cerebellum in *man* as essentially correct (καλῶς ἀποφαίνεται). His disagreement with Erasistratus in fact in no way diminishes the value of this text as evidence that Erasistratus' investigations were not confined to animals but also included man.

In the same note Fraser comments on Galen's criticisms of Erasistratus at K V 604 that this 'implies very strongly that Erasistratus had not even

dissected animals'. But the text¹⁶ carries no such implication. At most it tells us that Galen thought that Erasistratus had not carried out vivisections on animals in connection with the particular problem that Galen is interested in in this passage, namely the function of the dura mater, which is not to be the source of the nerves—as Erasistratus had originally believed—but to provide protection for the cerebrum. It cannot be used as evidence that Erasistratus had not carried out dissections;¹⁷ nor indeed can it be used as evidence that he never carried out any vivisections. The positive testimony of the long quotation that Galen gives from Erasistratus' own work implies quite clearly that he made dissections on both human and animal subjects and engaged in comparative anatomical studies of a kind very similar to those we know that Herophilus undertook.¹⁸

Galen provides, then, no grounds for rejecting Celsus' testimony concerning Erasistratus. On the contrary, so far as human dissection (though not vivisection) goes, he corroborates that report. There remains the question of where Erasistratus did that work. Celsus' statement that Herophilus and he carried out their investigations on men 'a regibus ex carcere acceptos' (see above, p. 173) has usually been taken as suggesting that both were working together at Alexandria at the time. Fraser remarks that 'Erasistratus, if he too was guilty [of human vivisection], may have performed his operations in Antioch—there would be nothing surprising if the Seleucid court emulated the Ptolemaic in this as in other respects',¹⁹ and indeed this possibility cannot be completely ruled out. Even so the balance of probabilities is against it. The problem of identifying the factors that inhibited the practice of human dissection in antiquity has often been discussed, but it is wise to admit that we are not in a position to state precisely what those factors were nor under what circumstances and for what reasons those inhibitions were occasionally overcome.²⁰ Yet it is clear that human dissection was difficult. That the practice declined, if it did not cease altogether, is shown by the evidence both of Rufus (*On the naming of parts*, p. 134, Daremberg-Ruelle) and of Galen (K II 220–1), although Galen notes that instruction

¹⁶ After the long quotation of Erasistratus (K V 602–4) Galen proceeds to criticism: εἰ δὲ καὶ τῶν ζῶωντων ζῶων ἐπεποίητο τὴν πείραν, ἦν ἡμεῖς οὐχ ἅπαξ οὐδὲ δίς, ἀλλὰ πάνυ πολλάκις ἐποησάμεθα, βεβαίως ἂν ἔγνω τὴν μὲν σκληρὰν καὶ παχείαν μήνιγγα σκέπης ἔνεκεν γεγεννημένην ἐγκεφάλου . . .

¹⁷ The καὶ in the phrase καὶ τῶν ζῶωντων ζῶων in the text quoted in the last note implies, if anything, that he had.

¹⁸ See, for example, the quotation from Herophilus at Galen K II 570–1.

¹⁹ *PA I* p. 349, cf. *RL* p. 531.

²⁰ The idea that the Egyptian custom of mummification facilitated the practice of human dissection in Alexandria has often been put forward, but seems quite doubtful.

¹⁴ Dissection of animals is attested in such passages as Galen, K II 648–9 and IV 718. On Fraser's view of K V 604, see above, p. 174.

¹⁵ This is Helmreich's text (Teubner, Vol. 1, 1907, p. 488). Kühn's (K III 673) differs in details, but yields substantially the same sense.

on the human skeleton was still given to medical students at Alexandria in his own day. But given that human dissection was difficult, and indeed that Alexandria is the only city explicitly mentioned in our ancient sources as a place where human dissection could be carried out,²¹ it is far less difficult to believe that Erasistratus, like Herophilus, did his researches there, than that there was a second centre where such researches were carried out in the third century, namely Antioch. Both suggestions are in the nature of conjectures. But whereas the element of speculation in the Antioch thesis is considerable, there is nothing improbable in the alternative view, that Erasistratus, like so many other third-century scientists, worked for a time in Alexandria—even though direct evidence to put this beyond doubt is lacking.²²

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²¹ Apart from the passage in Galen (K II 220–1) already mentioned, cf. also Fulgentius, *Mitologiarum*, Helm, p. 9.

²² The only sound direct evidence associating Erasistratus with the Ptolemies is the statement in Caelius Aurelianus (*On Chronic Diseases* v 2 50–1, mentioned by Fraser at *RL* pp. 526 f.) that he prescribed a plaster for King Ptolemy's gout. But that report does not necessarily imply either that Erasistratus was, or that he was not, at Alexandria at the time.

Back Views of the Ancient Greek Kithara

(PLATE XIX a)

In an appendix to their article 'Lute-Players in Greek Art' (*JHS* lxxxv [1965], 62–71) R. A. Higgins and R. P. Winnington-Ingram included useful material on the shape of the kithara, with a list of representations that attempt to show the depth and shape of the back of the kithara sound-box.¹ The list includes a mid-sixth-century metope from Delphi, back views from late fifth-century to late fourth-century coins, Hellenistic terra-cottas, and a back view on a late second- or early first-century relief, Athens National Museum 1966. These more-or-less three-dimensional objects show us a characteristic of the kithara that may affect the possibilities of playing technique, one that cannot be guessed by looking at the many front-view paintings: the back of the kithara soundbox bulges out at the top, tapering toward the base; and in examples from the fifth century and later, it rises to a vertical ridge running down the centre of the back.

To this group of objects should be added one more important item from the fifth century: the back view of a kithara which is part of the Parthenon frieze of the Panathenaic procession (447–432 B.C.). On

¹ Side views of the lyre and kithara, also mentioned by Higgins and Winnington-Ingram in connexion with the Mantinea reliefs, are treated in more detail by the present author in *The Galpin Society Journal* xxvii (1974).

slab VIII of the North Frieze (now on display in the Akropolis Museum as plaque 875) two kithara players move to the left. The first player shows the front of his instrument as he looks back toward the player following, but the second player faces forward and so shows us the back of his instrument. The right half of it is partly obscured by the player's arm and the traditional long cloth that hangs from the instrument, but the important features are clear.²

The relief, though probably shallower than an accurate scale model, is deep enough to permit some indication of the ridge down the centre of the back, the angle of the two halves of the back as they rise to this ridge, and the resulting triangular addition to the shape of the base. The upper edge of the body which, in the many kithara representations of the period, normally rises gently to the centre, would not show in this example even if the edge were not broken, as the player's hand and wrist-sling would have been in the way (the horizontal line near the top seems to indicate the wrist-sling). All that remains of the instrument's ornamental arms is the base of the one held against the player's chest.

From the standpoint of playing technique, it is the depth of the soundbox at the top that is of special interest, for the player (it is generally agreed) plucked and damped the strings with his left-hand fingers. It may not have been as easy to do this as we think; for his forearm lay over the bulging back of the soundbox, and this fact must be considered in assessing the possibilities for the use of the left hand.

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² The shape of the instruments is unfortunately not at all correctly represented in the Carrey drawing of this section of the frieze. The drawing does, however, provide information about the original number of players, the directions in which they faced, and so on. See Theodore Bowie and Diether Thimme, *Carrey Drawings of the Parthenon Sculptures* (Bloomington, Ind. and London, 1971), pl. 32.

Meniskoi and the Birds*

For Chick and Weedi

(PLATE XIX b–d)

Mentior at si quid, merdis caput inquirer albis
corvorum, atque in me veniat mictum atque cacatum
Iulius et fragilis Peditia furque Voranus.

Horace, *Satires* I, viii, 37–9.

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