

efficient (not a final) cause and that what he considers he has to explain is how the sex of the embryo is influenced by the side of the womb it is in, not how the side of the womb is determined by the sex of the embryo. It is because the right-hand side of the womb is hotter (and has purer blood) that it helps to produce hotter (that is male) offspring.

Reference to Galen's discussions elsewhere shows that this is indeed his view. *On the Use of Parts* xiv ch. 7, ii 302 ff., especially 309 f. Helmreich, and *On Seed* ii ch. 5, iv 626 ff. Kühn, especially, show that Galen's own doctrine is that the sex of the embryo is determined both (1) by the side of the body from which the seed of the male parent comes, and (2) by the side of the womb the embryo is in (in both cases right is correlated with hot and male, left with cold and female).² In his discussions of *Epidemics* vi ch. 48 he evidently interprets the Hippocratic text as in line with his own view, and the truth. When, therefore, he cites ancient writers (including Parmenides) in support of the view that males are generally formed on the right side of the womb, it is not to illustrate the idea that the position in the womb is determined by the sex of the embryo, but to support the doctrine that he himself maintains (and believed Hippocrates to hold), namely that the sex of the embryo is determined (partly) by the position in the womb. While the introductory statement quoted by Kember is ambiguous when taken on its own, its sense in the argument of the chapter as a whole is clear. It is no part of Galen's purpose to maintain or illustrate the doctrine that position in the womb is determined by sex: he is concerned to argue for the reverse connection.

Of course we cannot be certain whether Galen had good grounds for citing Parmenides in support of this view. As already noted, the fragment by itself is not conclusive evidence for this, nor can we be certain that Galen knew the context of Parmenides' statement. Moreover when Galen goes on to adduce Empedocles in this connection, he may well have misunderstood Empedocles' theory: Galen's interpretation appears, at least, to conflict with the testimony of Aristotle (*GA* 764a1 ff.).³ Nevertheless, despite these doubts, it seems to me that Galen provides the best evidence we have concerning Parmenides' theory of sex differentiation. As Kember shows, neither Fragment 18 (quoted by Caelius Aurelianus) nor Lactantius (*De opif.* ch. 12) nor Censorinus (*de die nat.* 5.2 and 3 f.,

² E.g. τῷ τοίνυν διττὴν μὲν ἀρχὴν εἶναι τῆς τῶν ἀρρένων γενέσεως, ἐν μὲν τοῖς θήλειαι τὴν δεξιὰν μήτραν, ἐν δὲ τοῖς ἄρρεσι τὸν δεξιὸν ὄρχιν, ἰσχυροτέραν δ' ὡς τὰ πολλὰ γίνεσθαι τὴν μήτραν ἐξομοιοῦν ἑαυτῇ τὸ κνούμενον, ὡς ἂν καὶ χρόνῳ πλεονί πλησιάζουσιν, εὐλόγως ὡς ἐπὶ τὸ πολὺ τὰ μὲν ἄρρενα τῶν ἐμβρύων ἐν ταύτῃ, τὰ δὲ θήλεια κατὰ τὴν ἀριστερὰν εὐρίσκειται (ii 309 Helmreich). Galen grants, however, that occasionally female embryos are found on the right of the womb, males on the left (e.g. iv 633 Kühn).

³ See *Polarity and Analogy* 17 n. 4.

6.5 and 8) helps us to discover Parmenides' views on that topic. Aristotle *PA* 648a28 ff., referring to a difference in temperature between the two sexes, is not clear on how Parmenides thought sex difference arose, and *GA* 763b30 ff. cannot be definitely referred to Parmenides. We are left, apart from Galen, with Aetius. v 7.2 does not provide the basis of a general theory of sex determination, and v 11.2 is not relevant to this problem at all. If the text of v 7.4 is sound, it is in direct conflict with Galen's testimony: but the reliability of v 7.4 is doubtful, if only because it attributes to Anaxagoras a view that contradicts the testimony of Aristotle (*GA* 763b30 ff.) on that philosopher.⁴ If Galen's testimony were in fact as ambiguous as Kember suggests, one might hesitate before choosing to follow Galen rather than Aetius. But if I am correct in arguing that the context in which Galen cites Parmenides makes it quite clear what Galen's interpretation of Parmenides' position was—namely that sex is determined by the position in the womb—then I would repeat that this text is the strongest evidence we have for Parmenides' theory of sex determination.⁵

G. E. R. LLOYD

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⁴ In an as yet unpublished article on Anaxagoras' theory of sex differentiation and heredity, Kember has, however, argued that the testimony of this passage in Aristotle 'cannot be unreservedly trusted'.

⁵ I am grateful to Professor Sandbach and to Mr Kember for comments on an earlier draft of this paper.

A Note on ΠΡΗΣΤΗΡΟΣ ΑΥΛΟΣ

In a recent article J. J. Hall has argued that the mysterious *πρηστήρος αὐλός* which figures in Anaximander's theory of the universe is the funnel-shaped body of a tornado or waterspout.¹ In reviewing meteorological evidence he notes that lightning often accompanies such storms. Anaximander himself could have concluded that the funnel is actually full of fire and then could have drawn an analogy between fiery heavenly bodies seen through a hole in surrounding mist and internal fire seen through the open bottom of a cloud.

M. L. West has expressed doubt about this suggestion on the grounds that 'a person in the uncomfortable situation of looking up such a funnel would not see fire.'² There are undoubtedly some difficulties in Hall's proposal, as he himself admits. But West's objection is oddly off the mark. What is initially at issue is what Anaximander believed to be true, not what is true. The tornado interpretation assumes

¹ 'ΠΡΗΣΤΗΡΟΣ ΑΥΛΟΣ', in *JHS* lxxxix (1969) 57 f.

² *Early Greek Philosophy and the Orient* (Oxford, 1971) 243.

only that he knew that lightning appears around tornadoes and *concluded* that it is also present in the cloud. It might be a valid objection if he were known to be trying to argue from direct knowledge of the facts (which he had misinterpreted). But even if he were appealing to facts, the objection need not be fatal, for the facts apparently could have provided spectacular confirmation of the analogy. Because of their extreme violence it has been impossible to establish reliable, detailed data about what happens inside tornadoes, but a few eyewitnesses have been in 'the uncomfortable situation of looking up such a funnel' and have lived to tell the tale.³

A most lucid and graphic account of a tornado was given by a Kansas farmer, Will Keller, who escaped unscathed even though a tornado passed directly over him. About four o'clock on the afternoon of June 22, 1928, Keller noticed greenish black clouds in the southwest. Suspecting a tornado, he watched and soon could see that not one but three tornadoes had developed. Two looked like ropes hanging from the clouds, but the closest, the one bearing down on him, had a real funnel shape. After hurrying his family into their cyclone cellar, Keller stopped in the doorway for one last look.

He saw the cloud coming steadily on and saw that the end was rising gradually above the ground. In what seemed like a long time but probably was only a few seconds, Keller realised that the great funnel was hanging directly over him. All wind had ceased, and a pungent odour prevailed. A screaming, screeching sound poured from the end of the funnel, and Keller, to his astonishment, could see up into the very interior of the vortex. The circular opening, which he judged to be between fifty and one hundred feet across and to extend upward at least one-half mile, was brilliantly lighted by lightning zigzagging from side to side. Small twisters formed and writhed around inside the rim of the tornado.

A similar experience with a Texas tornado was had by Roy S. Hall, a retired U.S. Army Captain, in May, 1948, and this description of the inside of the funnel—the flashing lightning giving a shimmering fluorescent glow, the terrific whirling, and the horrendous roar—is almost identical with the earlier description. In one respect, however, Hall's report adds a very interesting detail. As he looked up into the funnel, it appeared that the whole column was composed of rings or layers mounted one on top of the other much in the manner of a stack of automobile tires at a service station. If a higher ring moved laterally, the ring immediately below slipped over to a position underneath again, and this rippling motion continued through the funnel.

³ Clyde Orr, Jr., *Between Earth and Space* (New York, 1959) 58 f.

This does nothing, of course, to change the probability that Anaximander would have *inferred* the existence of internal fire. Tornadoes (to say nothing of opportunities to look into their interior) are rare in the eastern Mediterranean, and his own robust imagination would be quite up to the task of supplying missing data. He might have received knowledge of external lightning at first hand or from popular weather lore. But given the vast store of oral information upon which he could draw, it is at least possible that he had also heard an account going back to someone who had seen that fire not only accompanies but fills funnel clouds. It is, in any case, too much to say that the idea could not have been suggested by actual experience. And if Anaximander did have tornadoes in mind, we should credit the analogy between luminous heavenly bodies and funnel clouds lit at the bottom with greater consistency than it might seem to have.

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'Epoiesen' on Greek Vases: Other Considerations

Professor R. M. Cook has performed a valuable service by raising again the question of the meaning of this word in this context.¹ He finds that the weight of argument goes against the view that it means 'fashioned with his own hands,' in favour of its implying ownership of the workshop from which the vessel issued. In the end I disagree with Professor Cook, but the evidence is difficult to evaluate and appears contradictory, and certainly does not justify an unquestioning acceptance of the first interpretation. There are perhaps a few more general observations to be made, and a few points on which his remarks require modification.

1. The position of those who interpret the word as 'fashioned' is not always quite so unquestioning as he seems to suggest. Beazley wrote in *Potter and Painter in Ancient Athens* (1944): 'Two explanations have been offered for the epoiese-signature. One, that it gives the name of the potter, the man who fashioned the vase; the other, that it gives no more than the owner of the establishment from which the vase came. At one time I held it more prudent to adopt the second explanation: but I now believe that, *in general*, the first explanation is the right one: *Ευφρονιος εποισεν* means that Euphronios fashioned the vase with his own hands.'²

2. Professor Cook writes that he knows only three vases which bear the same name with both *egrapsen* and *epoiesen*: two by Exekias and one by Douris. I

¹ *JHS* xci (1971) 137 f.

² 25 f. Beazley's italics.