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THE ANALOGY OF AUGER BORING IN THE HIPPOCRATIC *DE VICTU*

The text of the Hippocratic treatise *De victu* as transmitted by the manuscripts poses numerous problems and at some places evidently cannot be construed without conjectural emendations. However, some conjectures have been made at places where the text does not necessarily need it. On the following pages I will discuss two such cases and suggest an interpretation saving the manuscript reading from a conjecture in chapter 7 and from a seclusion of a whole sentence in chapter 16, which unfortunately occur in all of the most influential twentieth-century editions of the treatise.[1] Both passages are concerned with the analogy of auger boring. I shall begin with a passage in chapter 7 in which the author explains the general principles of human nutrition and digestion (*τροφὴ ἀνθρώπου*). In the most recent critical edition the text reads as follows:[2]

ἔχον δὲ πάντα αὔξεται ἐν χώρῃ τῇ ἑωυτοῦ ἕκαστον τροφῆς ἐπιούσης ἀπὸ ὕδατος ξηροῦ καὶ πυρὸς ὑγροῦ, τὰ μὲν ἔσω βιαζομένης, τὰ δὲ ἔξω. ὥσπερ οἱ τέκτονες τὸ ξύλον πρίζουσιν, καὶ ὁ μὲν ἕλκει, ὁ δὲ ὠθεῖ, τωὐτὸ ποιέοντες· κάτω δὲ πιεζόντων ἄνω ἔρπει, οὐ γὰρ ἂν παρὰ <καιρὸν> δέχοιτο κάτω ἰέναι· ἢν δὲ βιάζηται, παντὸς ἁμαρτήσεται. τοιοῦτον τροφὴ ἀνθρώπου· τὸ μὲν ἕλκει, τὸ δὲ ὠθεῖ· ἔσω δὲ βιαζομένου ἔξω ἔρπει· ἢν δὲ βιᾶται παρὰ καιρόν, παντὸς ἀποτεύξεται.

The author first briefly describes the motion of the portions or particles of nutriment available in a human organism,[3] 'some being forced inside, others outside' (*τὰ μὲν ἔσω βιαζομένης, τὰ δὲ ἔξω*), and then, towards the end of the chapter, he summarizes it by saying: 'One part pulls, the other pushes; what is forced inside comes outside. But if violence be applied at the wrong time there is no success' (*τὸ μὲν ἕλκει, τὸ δὲ ὠθεῖ· ἔσω δὲ βιαζομένου ἔξω ἔρπει· ἢν δὲ βιᾶται παρὰ καιρόν, παντὸς ἀποτεύξεται*). As I take it, the author speaks here about ingestion of nutriment (*τὸ μὲν ἕλκει*) and secretion of excrements (*τὸ δὲ ὠθεῖ*), two different but interdependent activities within the digestion cycle. None of these activities should be forced at the wrong time (*βιᾶται παρὰ καιρόν*), both ingestion and secretion need appropriate time to undergo their natural intervals, otherwise the

[1] W.H.S. Jones, *Hippocrates. Volume IV.* The Loeb Classical Library (Cambridge, MA, 1931); R. Joly, *Hippocrate: Du régime* (Paris, 1967); R. Joly and S. Byl, *Hippocrate: Du régime*. Corpus Medicorum Graecorum (Berlin, 1984).

[2] *Vict.* 1.7 (130.18–29). Here and hereafter I am referring to the text and pagination as it appears in the CMG edition (Joly and Byl, n. 1). In spite of my criticism presented in this paper, I still believe that it is the most reliable edition of the treatise available.

[3] For the purposes of the present discussion I shall leave uncommented the disputable subject of the first sentence in the quoted passage. Elsewhere I argue (H. Bartoš, 'Soul, seed and palingenesis in the Hippocratic *de Victu*', *Apeiron* 42 [2009], 17–47) that in chs. 6–9 the author speaks about certain organic parts or seeds, which enter human organisms from outside and from which 'new' individuals can (under certain conditions) develop. As they enter the human body, 'each grows in its own place' and 'is increased and nourished by human diet', which is illustrated with the boring analogy in ch. 7.

FIG. 1. Albrecht Dürer, Man with an Auger, pen and ink, *ca.* 1496, Musée Bonnat, Bayonne.

natural balance within the digestion cycle might be disturbed (*παντὸς ἀποτεύξεται*) and our health (or even life) threatened.

In the middle of the chapter, sandwiched between the words *τὰ μὲν ἔσω βιαζόμενα*, *τὰ δὲ ἔξω* and the final summary of the nutritive principles, the author introduces a technical analogy describing two carpenters boring a log (see the underlined text). Although both main manuscripts (M and *θ*) read *ὥσπερ οἱ τέκτονες τὸ ξύλον τρυπῶσιν*, most editors replace the verb *τρυπῶσιν* with either *πρίζουσιν*[4] or *πρίουσιν*[5]: in both cases the activity of the carpenters is deliberately changed from 'boring' to 'sawing'. As to the first alternative, the only textual evidence in support of reading *πρίζουσιν* is to be found in manuscript *θ*, where a second hand has written *πρίζουσιν* over *τρυπῶσιν*. As to the plausibility of this correction, three points should be considered. First, the verb *πρίζω*, a later form of *πρίω*, occurs – as far as I know – in no other genuine Greek text from the Classical era and therefore it appears to be anachronistic in our treatise, which is usually dated between the end of the fifth and middle of the fourth century B.C.[6] Second, the occurrence of *πρίουσιν* in a similar passage in chapter 6[7] certainly makes *τρυπῶσιν* in chapter 7 the *lectio difficilior*, which, together with the agreement of the manuscripts and the non-attestation of the form *πρίζω* in the Classical

[4] Jones (n. 1), 242; Joly (n. 1), 9; Joly and Byl (n. 1), 130.

[5] É. Littré, *Œuvres complètes d'Hippocrate* (Paris, 1849), 6.480; C. Fredrich, 'Hippokratische Untersuchungen', *Philologische Untersuchungen* 15 (Berlin, 1899), 1–236, 114.

[6] Cf. Fredrich (n. 5), 223; Jones (n.1), xlvi; W. Jaeger, *Paideia: The Ideals of Greek Culture, vol. III* (New York, 1944), 33–40; G.S. Kirk, *Heraclitus. The Cosmic Fragments* (Cambridge, 1954), 27; H.W. Miller, 'The concept of *dynamis* in *de Victu*', *TAPhA* 90 (1959), 147–64; Joly and Byl (n. 1), 44–9; J. Jouanna, *Hippocrates* (Baltimore/London, 1999), 409; R.J. Hankinson, 'Greek medical models of mind', in S. Everson (ed.), *Psychology.* Companions to Ancient Thought 2 (Cambridge, 1991), 194–217; P.J. van der Eijk, *Medicine and Philosophy in Classical Antiquity* (Cambridge, 2005), 169.

[7] *πρίουσιν ἄνθρωποι ξύλον· ὁ μὲν ἕλκει, ὁ δὲ ὠθεῖ, τὸ δ' αὐτὸ τοῦτο ποιέουσιν· μεῖον δὲ ποιέοντες πλέον ποιέουσι* (*Vict.* 1.6 [130.2–3]).

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period, makes it the *lectio potior*. And third, the manuscript θ dating back to the tenth or eleventh century A.D. bears evident traces of other deliberate alterations, for instance changing the plural θεοί into singular θεός (136.2) as well as correcting all suffixes implying the plurality of gods (218.20, 218.22, 224.25), and obliterating all names of Greek gods mentioned in Book 4 (224.26 ff.). Though it is not clear whether the corrector of πρίζουσιν over τρυπῶσιν is identical with the Christian censor or not, these evidently posterior corrections should not be taken as the authority for changing the text in modern editions aiming at a trustworthy reconstruction of the original wording of the ancient text.

Aside from the textual ambiguity, there is another, seemingly more important reason for emendation, which arises from the following interpretative difficulty: 'boring with an auger seems an impossible action to represent by ἕλκει and ὠθεῖ', as Jones puts it.[8] Some editors therefore searched for a possible solution by means of changing τρυπῶσιν to πρίουσιν in chapter 7.[9] Since the activity of sawing fits well with ἕλκει and ὠθεῖ, this conjecture seems to be quite appropriate, but we should also consider the following points. First, unlike the case of πρίζουσιν, there is no reliable support in the numerous manuscripts for reading πρίουσιν in our chapter,[10] and second, the suggested solution can be helpful only in chapter 7, but not in chapter 16, where we come across the same interpretative difficulty once again, as I shall discuss later.

We have seen that the manuscript authority for τρυπῶσιν in chapter 7 is very strong and that the main problem is interpretative rather than textual. I would suggest an alternative possible solution to our difficulty by finding a suitable craft activity represented by the expression τρυπῶσιν, which fits well with the verbs ἕλκει and ὠθεῖ. Jones has already made such an attempt in the Appendix to Book 1, where, in spite of his doubts about the original reading τρυπῶσιν, he admits that 'it is quite possible that it is right' and submits an interesting suggestion worthy of consideration:

> Dr. Peck thinks that a horizontal auger could be worked up and down by a leather thong. But though you can pull a thong you cannot push it. Perhaps there is a reference to the working of an auger by means of a bow, the string of which was twisted round the top of the auger, and then the bow was worked just as a saw.[11]

Jones' suggestion of a bow drill is a possible solution sufficient for saving the manuscript reading. Such a tool was commonly used in ancient times for drilling holes into stones, bones, teeth or other hard materials, but sometimes also for boring wood.[12] A longer bow can conceivably be used with two craftsmen pushing and pulling the bow in exchange (ὁ μὲν ἕλκει, ὁ δὲ ὠθεῖ, τωὐτὸ ποιέοντες) and the main interpretative objection can thus be dismissed. But a weakness of

[8] Jones (n. 1), 296.

[9] See n. 5.

[10] Fredrich (n. 5), 114 refers to the rather insignificant fourteenth-century manuscript R (Vaticanus gr. 277), which he claims reads πρίουσιν, but neither Jones nor Joly with Byl confirm this manuscript reading.

[11] Jones (n. 1), 296.

[12] For the technical details, terminology and archaeological evidence concerning ancient drills and augers see H. Blümner, *Technologie und Terminologie der Gewerbe und Künste bei Griechen und Römern*, Band 2 (Leipzig, 1879), 222–6; and W. Smith, *A Dictionary of Greek and Roman Antiquities* (London, 1890), s.v. *terebra*.

Jones's interpretation is that a drill driven by a bow rotates in both directions and therefore its effect depends mainly on downward pressure and speed of the drill, which crushes the material into dust rather than carving it. Moreover, the friction of the drill generates heat and causes wood to ignite and burn. Such technology can be effective only for making relatively small holes, whereas for making bigger holes (which seems to be implied by the reference to two carpenters moving the same instrument) a helical auger would be a much more effective tool.[13] We can imagine an auger similar in shape to a corkscrew (see the one depicted in Fig. 1), consisting of a long metallic shaft and a large cross handle at the top at right angles to it, enabling the craftsman to apply both his hands with a considerable leverage. Where necessary, such an instrument can be operated by two men standing on either side of the auger and each grasping both ends of the handle every time again after the auger has rotated 180 degrees around its axis. In turning round the shaft, its helical cutting edge turns out the chips of wood in spiral pieces and pulls them out of the hole. Both carpenters will pull and push the auger handle at the same time (*ὁ μὲν ἕλκει, ὁ δὲ ὠθεῖ, τωὐτὸ ποιέοντες*), one will be pulling and the other pushing on the one side of the handle, and likewise on the other side of the handle.[14] The action of boring into the log (downwards) is counterbalanced by pulling the sawdust out of the log (upwards) and therefore fits well with the description *κάτω δὲ πιεζόντων ἄνω ἕρπει*.

To conclude the discussion on chapter 7, I see no serious justification for emending *τρυπῶσιν* in this passage, either to *πρίουσιν* or to *πρίζουσιν*, and the text as it is presented in the manuscripts can be kept. Whether we accept Jones's bow drill or the helical auger I am suggesting, boring is definitely not 'an impossible action to represent by *ἕλκει* and *ὠθεῖ*'. The reciprocal pull–push movements illustrate certain physiological processes of the digestion cycle: ingestion and digestion of nutriment, secretion of excrements and even ejaculation of sperm, as I will discuss later.

I have already indicated that the interpretative puzzle we have discussed in chapter 7 reappears in chapter 16, where we read:

Τέκτονες πρίοντες ὁ μὲν ὠθεῖ, ὁ δὲ ἕλκει, τωὐτὸ ποιέοντες ἀμφότεροι· [τρυπῶσιν, ὁ μὲν ἕλκει, ὁ δὲ ὠθεῖ·] πιεζόντων ἄνω ἕρπει, τὸ δὲ κάτω· μείω ποιέοντες πλείω

[13] The problem is that according to the depicted analogy we need two carpenters using the same instrument, but the second assistant doing the same thing as the first one (*ὁ μὲν ἕλκει, ὁ δὲ ὠθεῖ, τωὐτὸ ποιέοντες*) cannot substantially increase the effectiveness of the bow boring: the drill rotates in both directions according to the pushing and pulling of the bow and its effect depends mainly on downward pressure and speed of the drill, not on its torsional force, as in the case of the helical auger I am suggesting. The difference between the two boring techniques is attested by Pliny as well as Columella: a *terebra gallica* (our helical auger) produces shavings, whereas a *terebra antiqua* (e.g. the bow drill) produces dust and generates heat (Plin. *HN* 17.116; Columella, *Rust.* 4.29, 15 and 16).

[14] As the anonymous reviewer has pointed out, my interpretation may invite the objection that 'the two men operating the auger would thus both be pushing or pulling at the same time, rather than one pushing, the other pulling (*ὁ μὲν ἕλκει, ὁ δὲ ὠθεῖ*)'. To this objection I suggest that we envisage the following situation: man A is grasping one side of the handle (H^1) with his left hand and pushes, man B (standing opposite to man A, having the auger between them) is grasping the same side of the handle (H^1) with his right hand and pulls (*ὁ μὲν ἕλκει, ὁ δὲ ὠθεῖ*). At the same time man A is grasping the opposite side of the handle (H^2) with his right hand and pulls, man B uses his left hand to grasp the same side of the handle (H^2) and pushes. It is true that the text describes only one side of the handle and does not explicitly mention that the same action happens simultaneously but contrariwise on the other side of the handle. Nevertheless, I do not find this objection crucial for my suggestion.

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ποιέουσι <καὶ πλείω ποιέοντες μείω ποιέουσι>. φύσιν ἀνθρώπου μιμέονται. τὸ πνεῦμα τὸ μὲν ἕλκει, τὸ δὲ ὠθεῖ· τωὐτὸ ποιεῖ καὶ ἀμφοτέρως. τὰ μὲν κάτω πιέζεται, τὰ δὲ ἄνω ἕρπει. ἀπὸ μιῆς ψυχῆς διαιρομένης πλείους καὶ μείους καὶ μέζονες καὶ ἐλάσσονες.[15]

While Littré accepts the sentence *τρυπῶσιν, ὁ μὲν ἕλκει, ὁ δὲ ὠθεῖ* without difficulties, later editors tend to question the manuscript reading and seclude the sentence from the text. Fredrich bracketed the whole sentence (*τρυπῶσιν, ὁ μὲν ἕλκει, ὁ δὲ ὠθεῖ*),[16] probably supposing that it is only 'a stupid note which has crept into the text',[17] and others followed him.[18] While Jones at least leaves the sentence in his translation ('[When boring, one pulls and the other pushes]') and by doing so enables his English readers to make their own judgement about the passage,[19] Joly completely omits it in his French translation with a rather exaggerated and unspecific remark,[20] or – even worse – without any explanation at all, as in the CMG 1984 edition.[21]

In the present case of chapter 16, any reasons for secluding the words *τρυπῶσιν, ὁ μὲν ἕλκει, ὁ δὲ ὠθεῖ* are obviously purely interpretative, and closely related to (or even following as a consequence of) the emendation accepted already in chapter 7. But if we are able to defend the manuscript reading in chapter 7 by introducing an acceptable illustration of boring by pulling and pushing, we can certainly do the same in chapter 16.

But there is a further difficulty with our chapter, viz. the analogies of sawing and boring are discussed here in an extremely condensed way, and therefore it is not surprising that some interpreters find the whole passage corrupt and unreadable without conjectures,[22] while others even question the text's consistency.[23] In my opinion, the passage is readable as consistent with the corresponding passages in chapters 6 and 7, where the craft activities are presented separately, each in its own context. With these passages in mind, we can legitimately relate words *μείω ποιέοντες πλείω ποιέουσι* to the activity of sawing (as in ch. 6) and *πιεζόντων ἄνω ἕρπει, τὸ δὲ κάτω* to auger boring (as in ch. 7). Both activities illustrate a specific aspect of human nature (*φύσιν ἀνθρώπου μιμέονται*), and can be understood in the following way.

[15] *Vict.* 1.16 (138.3–8).
[16] Fredrich (n. 5), 118.
[17] Jones (n. 1), 296.
[18] Jones (n. 1), 254; Joly (n. 1), 15; and Joly and Byl (n. 1), 138.
[19] Jones (n. 1), 255.
[20] 'Tout ce passage est fort malmené dans la tradition manuscrite; l'établissement du texte reste forcément conjectural' (Joly [n. 1], 15 n. 3).
[21] The only remark we can find in the apparatus criticus laconically says: '*τρυπῶσιν – ὠθεῖ* secl. Fredr.' (Joly and Byl [n. 1], 138).
[22] See n. 20.
[23] According to Jones, some details in the treatise are blurred because they are not regarded by the Hippocratic author as essential to the main argument, he is sometimes 'inconsistent with himself', and it is 'a great mistake for an interpreter to insist on making all the detail harmonize exactly' (Jones [n. 1], xxxix). Kirk holds that there are places in the Heraclitean passages (namely in chs. 3–24, 25 and 35) where the Hippocratic author 'simply did not know what he meant' (Kirk [n. 6], 21). H. von Koller supposes that author's thesis presenting *technai* as imitations of human nature 'nur ganz oberflächlich und nur teilweise durchgeführt wird', and that some analogies (including the one in ch. 16) 'vom Autor ad hoc erfunden worden sind, um seine absurden These mit herakleitischem Tiefsinn vorzutragen' (H. von Koller, *Die Mimesis in der Antike* [Bern, 1954], 61).

The first aspect of human nature represents breathing as a cycle consisting of two opposed phases, inhalation and exhalation (*τὸ πνεῦμα τὸ μὲν ἕλκει, τὸ δὲ ὠθεῖ· τωὐτὸ ποιεῖ καὶ ἀμφοτέρως*), illustrated by the activity of boring (*τωὐτὸ ποιέοντες ἀμφότεροι· τρυπῶσιν, ὁ μὲν ἕλκει, ὁ δὲ ὠθεῖ*). The remaining words *τωὐτὸ ποιέοντες ἀμφότεροι* may apply (probably intentionally) to both craft activities: sawing (as in ch. 6: *τὸ δ' αὐτὸ τοῦτο ποιέουσιν*) as well as boring (as in ch. 7: *τωὐτὸ ποιέοντες*).

The second aspect of human nature concerns dissemination, namely division of sperm into greater and smaller pieces.[24] In the light of chapters 6–9, where growth and development of seeds was already discussed, we can render the last sentence in chapter 16 as a continuation of the same discussion of reproduction.[25] The analogy of a log sawn by carpenters into many pieces (*μείω ποιέοντες πλείω ποιέουσι*) illustrates the physiological process of dissemination, namely the fact that the decreasing amount of originally homogeneous sperm is counterbalanced by the increasing number and diversity of its disseminated parts (*ἀπὸ μιῆς ψυχῆς διαιρομένης πλείους καὶ μείους καὶ μέζονες καὶ ἐλάσσονες*).[26]

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[24] Cf. R. Joly, *Recherches sur le traité pseudo-hippocratique Du régime* (Paris, 1960), 77; id. (n. 1), 20 n. 2.

[25] At the beginning of ch. 8 we read that human seeds (cf. n. 3), both female and male, keep the same position until they have no sufficient room 'for the greatest possible extension', they cease to draw nourishment and 'pass into larger room, driven along in the same manner by force and necessity'. Supposing that these words describe the process of ejaculation and that the following text in chs. 8 and 9 speaks about the process of conception and formation of the human embryo, we can understand the last words in ch. 16 (*ἀπὸ μιῆς ψυχῆς διαιρομένης πλείους καὶ μείους καὶ μέζονες καὶ ἐλάσσονες*) as a remark commenting about what happens with the seeds during ejaculation. Moreover, the author illustrates it by the same craft analogy as he employed already in ch. 6, where his discussion on the development of seeds originated.

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