CHAPTER NINE

WATER, HEALTH AND DISEASE IN THE HIPPOCRATIC TREATISE AIRS, WATERS, PLACES

*Airs, Waters, Places* is the only treatise from the Hippocratic Corpus that devotes substantial discussion to the effects of the internal usage of water on health and disease. Elsewhere, in some of the dietetic treatises, we find brief discussions of water. For example, the author of *Regimen in Acute Diseases* devotes a short passage to water as a drink, but this is only from the perspective of the treatment of acute diseases. More surprising is the fact that the treatise *Regimen*, which contains the most detailed catalogue of foods and drinks in the Hippocratic Corpus, dedicates only one pithy and succinct sentence to water: “water is cold and wet” (ch. 52, 6.554, 7 L. = Joly 50, 3). There is a great contrast between this laconic declaration and the rich discussions in *Airs, Waters, Places* on the different kinds of water that men habitually drink or use. We can say without any hesitation that it constitutes the most fundamental text for the study of the different categories of water and their relationship with health and disease in the history of western medicine.

Why is water such an important theme in the treatise, and how are the different aspects of water presented? This two-pronged question will be the object of the first section of this paper.

Let us first consider the aim of the work. *Airs, Waters, Places* belongs to the category of treatises written for doctors, although it is uniquely addressed to a well-defined category of specialists: practising doctors who travel from one city to another. When the itinerant doctor arrives in a city he does not know, he must consider the various factors that have the greatest effect on health and disease, so that he can impress the inhabitants by the accuracy of his prognoses and the efficacy of his treatment. At the start of his

---

1 There is also another Hippocratic work about water, suggested both by the title given to it by medieval manuscripts, *On the Use of Liquids* and, above all, by its more ancient title attested in Erotian, *On Waters*. However, this short treatise only concerns the external usage of liquids (fresh water, sea water, vinegar, wine) in the form of sprinkling, bathing, or vapour baths on various complaints.

This is an open access chapter distributed under the terms of the CC-BY-NC License.
treatise, the Hippocratic author lists the following five important factors: the seasons of the year, the winds, the qualities of the different kinds of water, the nature of the terrain, and finally, the diet of the inhabitants. The order of this list already shows the remarkable place the author accords to the observation of water, since he quotes this factor in third position, after the climate and the city's orientation to the winds, and before the influence of the terrain and the inhabitants’ diet. What is all the more remarkable is that the author sets water apart from the inhabitants’ diet; this is, it seems, the only example in the Hippocratic Corpus where this occurs. In *Airs, Waters, Places*, as in the other treatises, ‘diet’ comprises three elements: food, drink, and exercise. However, by drink, the author of *Airs, Waters, Places* means wine. Since the diet of the inhabitants of a city could vary, and people may or may not enjoy drinking wine, what remains as the liquid that is used by everyone in the city is the available water: it is drunk, either alone or mixed with wine, and it is used in cooking, not to mention its external usage. Thus, it forms part of the environmental factors.

The importance accorded to water and its separation from diet are even clearer in the main body of the work, since two of the five important factors announced in the introduction (the inhabitants’ diet and the nature of the terrain) are not given a discussion of their own. Thus, the medical part of the treatise only includes three main sections. The discussion of water occupies a central position (ch. 7–9), following after the passage about the orientation of cities towards the winds (ch. 3–6), and before the discussion of climate (ch. 10–11).

The discussion of water is the longest of the three: it takes up one hundred and fifty six lines in H. Diller’s edition, whilst the discussion of the orientation of places takes up only one hundred and thirteen, and the discussion of climate only eighty. Thus, the discussion of water is nearly twice as long as that of climate. This is all the more surprising because the technical section on water is not, if I may say so, the most attractive for the reader who explores *Airs, Waters, Places* for the first time.

The importance attached to water in the medical section of the work is demonstrated by the fact that it is also discussed in the first section on the orientation of cities towards the winds. When the author presents the nosological outline of four cities corresponding to the four principal possible orientations towards the winds, he talks not only about the winds,

---

2 H. Diller, *Hippocratis De aere aquis locis*, CMG I 1, 2 (Berlin, 1970). *[For a more recent critical edition of the treatise see J. Jouanna, *Hippocrate. Airs, Eaux, Lieux* (Paris, 1996)].
but also about the quality of the water. Moreover, in the third section on climate he also alludes to the quality of the cities’ waters.

Thus, the theme of water has a strong presence throughout the first, medical part of the work; not only is the central and longest part of the text dedicated to water, but information about water can also be gleaned from the two other sections, on the orientation of places and the seasons, which precede and follow it.

Finally, *Airs, Waters, Places* is the first to extend the medical part with an ethnographic section, in which the peoples of Asia and Europe are compared, explaining the principal physical and moral differences between these two peoples by reference to a system based on the factors listed in the first, medical part of the treatise. Thus, it is not surprising that here, too, we find a discussion of the quality of water. This is confirmed by the presence of the word ἰδασι on the page of the newly discovered manuscript from Paris that provides us with the end of *Airs, Waters, Places*. However, the passages dedicated to water in this second, ethnographic part are shorter, since climate emerges as the principal factor that explains the physical and moral differences between the two peoples, the second being a human factor, customs and laws.

Having seen how references to water are distributed throughout the treatise, let us now turn our attention to the way in which the principal section on waters is structured. The author (who is, above all, a doctor) wishes to demonstrate the influence of waters on health and disease. He says this very clearly in the sentence that introduces this section in ch. 7. He concludes his discussion of the orientation of cities towards the winds by saying: “This is what there is to say on the subject of winds, on those that are beneficial and those that are harmful”; and he introduces his discussion of water in the following way: “On the remaining subject (i.e. water), I wish to discuss those kinds of water that are unhealthy and those that are very healthy, the harmful effects or the benefits that normally result from water; since water contributes a very large part to good health” (*Airs, Waters, Places* 7, 2.26,8–11 L. = Diller 34,16–19). This transition, apart from underlining the parallelism between the two principal factors that explain local diseases peculiar to each city (winds and waters), shows both the aim of the discussion, which will be more nosological than therapeutic, and the importance the author accords to this factor. The statement that

---

3 *[Par. gr. 2047 A; see ed. J. Jouanna (see above, n. 2), Notice, pp. 108–109 and Text p. 247,4].*
waters contribute a very large part to good health (ch. 7: πλέιστον γὰρ μέρος συμβάλλεται ἐς τὴν υγείαν) recalls a similar phrase that the author used previously about astronomy to show the importance of the climate on health: “astronomy does not play a small role in medicine, but a very large role” (ch. 2: οὐκ ἐλάχιστον μέρος συμβάλλεται ἀστρονομίῃ ἐς ιθυμαίαν, ἀλλὰ πάνω πλείστον: Airs, Waters, Places 2, 2.14,16–18 L. = Diller 26,19–20).

This important influence of water on health is demonstrated in a well-structured section of the text, whose organisation rests on the distinction between several important categories of water, generally well delineated by introductory and concluding phrases, as is typical throughout the treatise. The first subdivision concerns stagnant waters of marshes and lakes (ch. 7a: 29 lines of Diller’s edition); the second concerns spring waters (ch. 7b: 35 lines); the third subdivision (ch. 8) differs from the previous two because it includes two categories of water: rain water and snow water. The introductory and concluding phrases of this third subdivision are very clear. The concluding phrase corresponds to the opening phrase (“I will discuss rain waters and snow waters”): “This is what there is to say concerning rain waters and waters coming from snow and ice” (Airs, Waters, Places 8, 2.32,17 L. and 36,18–19 = Diller 40,7–8 and 44,3–4). Although these two categories are discussed in the same subdivision, they are clearly distinguished in the text: first, rain water (34 lines); then, water coming from snow and ice (only 12 lines). Finally, the fourth and last division (ch. 9) concerns a fifth category of very diverse kinds of water, originating either from large rivers into which flow other rivers, or from lakes into which flow numerous streams of water, or from water carried through pipes over great distances (40 lines).

We note that this division into five main categories, which here makes its first appearance in extant Greek literature, is given no justification; the author probably feels no need to do so because these distinctions had already been made before him. Hippocrates is our first witness only because the scholarly literature that preceded him or that he inherited has disappeared.

Having discussed the overall structure of the section devoted to different kinds of water, let us now turn to a comparison of the structure of each of the subsections on the principal categories of water. In contrast to the superficial impression of rigidity and monotony given by the stereotypical introductory and concluding phrases, we find that the organisation of their

---

4 Note that the traditional division into chapters does not respect the natural structure of the discussion: only three chapters for four subdivisions and five categories of waters.
contents displays great elegance. The author never loses sight of his essential aim to show the influence of the different categories of water on health and disease. For example, the discussion of mixed water is the longest (40 lines), because it comprises a kind of short monograph on one of the complaints caused by these mixed waters, lithiasis, which takes up more than half the discussion (26 lines). However, the structure of some passages indicates that the author’s scientific horizon is much larger. This is particularly the case in the discussion of rain water, whose length is almost comparable to the passage on mixed water (34 lines). Since rain water is best for health, the diseases that can occur if it is not boiled are listed in one single line. Good health, like happiness, is uneventful. What, then, is the subject matter of almost the entire passage? It is a kind of physical treatise on the formation of rain water, which is longer than the medical monograph on lithiasis.

A comparison of the structure of these two subsections shows us that one of the original features of this treatise, which is a fundamental text on the connections between water and health, is that medical knowledge is coupled with the knowledge of the ‘natural philosopher’. More precisely, that medical knowledge implicitly supposes a prior knowledge of the nature of the different waters and their origin, i.e. knowledge comparable to that of the pre-Socratic philosophers’ inquiry περὶ φύσεως (‘On nature’). It is to this prior knowledge that we now turn in the second section.

In the first passage of *Airs, Waters, Places*, the author declares that a doctor should know the δύναμις of a particular kind of water in order to judge if it is favourable to health or not, and he recommends that the doctor examine the various kinds of water:

> Moreover, it is necessary to consider the δύναμις of the waters; just as they differ in flavour and weight, their δύναμις also differs greatly between one and the other.⁵

I have not translated the Greek word δύναμις because it is untranslatable. Traditional translations such as ‘quality’ or ‘property’ are a lesser evil, since they hide the dynamism of the Greek term. The δύναμις of a particular kind of water is not only the permanent quality that defines its nature, but also its power to act upon a human body. The term δύναμις has, at first sight, a meaning that is both physical and biological. It is the point of departure for

---

⁵ *Airs, Waters, Places* 1, 2.12,6–9 L. = Diller 24.8–10.
the natural philosopher, who defines the nature of water and who does his best to account retrospectively for a genetic explanation of its formation. It is also the point of departure for the doctor who, knowing the water's δύναμις, can determine its pathological action on man. These two steps constitute one of the Hippocratic treatise's original features.

Thus, the δύναμις of a particular kind of water is fundamental. Certain historians of science may wish to see in it proof, amongst others, of the predominance of qualitative thinking in Greek science. This is correct; but what is most remarkable about this first passage of *Airs, Waters, Places* is that the author does not speak of the δύναμις of one kind of water in the singular, but of the different δυνάμιες of waters in the plural. This approach to the problem is radically different from what we find in the two dietetic treatises of the Hippocratic Corpus mentioned at the start of this paper: *Regimen in Acute Diseases* and *Regimen*. These works speak uniquely of the properties of water in the singular. Whilst the author of *Regimen* recognises only two properties of water—it is cold and wet—the doctor of *Airs, Waters, Places* highlights first the diverse qualities of water and then, in the course of his discussion, distinguishes the numerous possible qualities that define its different types.

Although there is not enough space here to give an exhaustive account of all the qualities that can be attributed to water, a few examples will remind us of the richness of the range available to the author. Of course, water can be cold or hot; and some kinds of water are hot in summer and cold in winter, while others are cold in summer and hot in winter. Some qualities are expressed in opposites and mutually exclusive; for example, waters are clear or cloudy; they are odourless or have a bad odour; they are thin or thick; they are sweet or salty. The antithesis of soft and hard waters plays a major role in the treatise. Conversely, some qualities are also combined. Certain kinds of water can be thick, bad-smelling, discoloured and muddy at the same time; others can be sweet, white and light.

The list of these qualities gives an initial idea of the fineness of the author's analysis in his description of waters, and it poses the problem of how these qualitative measurements were carried out. The variety of qualities presupposes that the doctor has to use several senses: sight (for example, clear or muddy waters; white or discoloured waters); smell (waters can have a good or bad odour); taste (fresh or salted waters). The author also pays attention to culinary matters: waters can be more or less favourable to cooking; they can be drunk with more or less wine. For certain qualities, we do not know exactly what allowed them to be determined (for example, soft or hard waters).
In the particular case of light or heavy water, we may wonder if the author had recourse to quantitative means of investigation, i.e. if he weighed the water. It is certain that in later times, water was weighed with scales. For example, in Athenaeus’ Deipnosophists (2.43 b), it is said: “having weighed the water from the Pirenian Spring at Corinth, I found it to be the lightest of all Greece.” Another passage in Athenaeus, in the same context, confirms that we are talking about weighing with scales; “the waters neighbouring the mines which surround Pangaeum weigh 96 drachmas a cotyle in winter, and in summer 46” (2.42a–b). Of course, the testimony of Athenaeus does not necessarily prove that water was weighed in Hippocrates’ time. Indeed, we could argue that the lightness or heaviness comes from the impression left by water’s taste. In the same discussion of water, Athenaeus says (2.42 a): “Other waters are like a solid body and have a similar density, such as the water of Troezen, which when tasted, fills the mouth.” We also find evidence in the Hippocratic Corpus that weight did not necessarily serve doctors in Hippocrates’ time as a criterion for the lightness of water. In Epidemics 2 and Aphorisms, the criterion for the lightness of water is the fact that it warms up and cools down rapidly. However, it seems completely unambiguous in Airs, Waters, Places that its author distinguishes between flavour and weight from the very first sentence, where he advises the doctor to take waters into account: “Waters,” he says, “differ by their taste in the mouth and by their weight” (σταθµ/uni1FF7). Since he speaks explicitly of weight, and talks about taste in the mouth and weight in the same sentence, we may conclude that he did not rely only on taste to appreciate the lightness or weight of the water, but that he weighed the water with a scale. Although there is no explicit mention in the rest of the treatise of weighing water with scales, we may suppose that the author carried out a quantitative measurement of the water. The procedure is worth quoting because it is one of the rare examples of quantitative experiments that we find in the Hippocratic Corpus. Through this experiment, the author wishes to show that water from snow and ice does not revert to its initial nature, but loses any clean, light and sweet aspect and preserves only the heaviest and weightiest part:

You can confirm this in the following manner, if you wish: in the winter, pour water into a vessel after having measured it and expose it to the open air until

---

6 Epid. 2.2, 11. (5.88,15–17 L.) and Aphorisms 5.26 (4.542,1–2 L.): “The water which heats up and cools rapidly is the lightest.”

7 Airs, Waters, Places 1, 2.12,7–8 L. = Diller 24,9.
it is all frozen, and then on the following day bring it inside where the ice will thaw; you will find, by measuring the water again when the ice is melted, that its quantity is much diminished. This is a proof that, under the influence of freezing, the lightest and thinnest part dissipated and dried, and not the heaviest and thickest, for that is impossible. For this reason I think these waters are the most harmful for all uses, i.e. those waters from snow and ice, and those similar to them. (Airs, Waters, Places 8, 2.36, 9–19 L. = Diller 42, 18–44, 2, Trans. C.D. Adams, modified)

This is a quantitative procedure, for the same water is measured before and after freezing and a reduction is observed in the water’s quantity. This measurement is not made with scales, but with one of the measures of quantity known to the Greeks to measure liquids. It goes without saying that, if the procedure is described correctly, his interpretation is wrong, since the author immediately infers a qualitative change from a quantitative reduction. According to the author, if the water has lost volume, this means that it has not returned to its initial nature and has lost certain qualities. However, this quantitative procedure, although imperfect, remains one of the most remarkable testimonies to the author’s scientific spirit.8

This procedure highlights a second characteristic of the scientist’s discussion of water. He is not content with simply listing the different qualities of waters in order to identify subsequently their influence on health and disease, but he endeavours each time to explain these qualities by the water’s origin or the way in which it has come about.

Concerning origin, we can take different kinds of spring water as an example, for their nature and qualities vary between them according to the nature and qualities of the terrain from which they spring. For example, spring water is hard when it comes from rocks or terrain that contains metals such as gold, silver or copper etc. Conversely, waters that come from hills of earth are sweet and white and can be drunk with less wine.

Concerning the way water comes about, we can take rain and snow water as an example, which present opposite cases. Rain is formed from the lightest (κουφότατον) and the thinnest (λεπτότατον) water, which has been separated from the rest, whilst ice is formed from the heaviest (βαρύτατον) and thickest (παχύτατον) water that remains after separation from the lightest (κουφότατον) and thinnest (λεπτότατον) parts.

---

8 On this quantitative experiment, see M.D. Grmek, La première révolution biologique: réflexions sur la physiologie et la médecine du XVIIe siècle, (Bibliothèque scientifique Payot) (Paris, 1990), p. 31f.
It is particularly in these comments that the Hippocratic doctor’s discussion agrees with pre-Socratic naturalism. His long, specialised discussion of the formation of rain water is the most striking example, and its explanations are very similar to those of the sixth-century Ionian philosophers (Anaximander of Miletus, Xenophanes of Colophon) and of Diogenes of Apollonia, the fifth-century philosopher who continues and renews the Ionian tradition.\(^9\) The lightest part of salted water, in salty bodies such as the sea, is lifted, pulled by the sun: it is softened by the boiling of the sun; then it condenses and falls again in the form of sweet rain water. It would be premature to infer the influence of Diogenes of Apollonia on Hippocratic medicine from these similarities, for it could also be a case of independent use of common knowledge. Indeed, by drawing on the observation of biological phenomena in order to confirm cosmological theories, the doctor’s discussion goes beyond the philosophers’ explanations (judging, at least, from the doxographies that have survived). In his specialised discussion of the formation of rain, the doctor confirms the physical law according to which the sun attracts all liquid by reminding his readers of a more properly medical observation, viz. that sweat evaporates or does not evaporate depending on whether the skin is protected from the sun or not. In any case, the passage from *Airs, Waters, Places* on the formation of rain is exceptionally important for the history of physics in antiquity, since it is the oldest passage to preserve a complete and authentic explanation, whilst the opinions of the pre-Socratic philosophers are known only indirectly through later, more or less simplified, summaries.

More generally, the collection of passages where the Hippocratic author of *Airs, Waters, Places* endeavours to explain the qualities of different waters by their origin or formation is an irreplaceable witness to causality in ancient physics. The systematic rigour of the author’s explanation does not exclude complexity, or even flexibility. One of the signs of such rigour in causation is the author’s very frequent use of the term *ἀνάγκη* (‘it is necessary’) to deduce the qualities of the different waters from the different conditions that explain them. Here is the passage on stagnant waters as an example:

---

\(^9\) [Anaximander: DK 12 A 27 (= Plutarch, *Epitom.* 3.16); Xenophanes: DK 21 A 46 (= Stobaeus, *Ecl.* 1.31); Diogenes of Apollonia: DK 64 A 17 (= Alexander of Aphrodisias, *Commentary on Aristotle’s Meteorologica* 353a32, p. 67,12 CAG): “Diogenes says that the cause of the saltiness of the sea is as follows: as the sun causes the sweet part of the sea water to rise, the effect is that the part that is left behind and remains is salted.” See J. Jouanna, *Hippocrates* (Baltimore and London, 1999), pp. 260–262.]
We come to stagnant and marshy waters and waters from lakes. In summer, these waters are necessarily hot, thick, and foul smelling, since they have no current; but being constantly supplied by rain-water, and the sun heating them, these waters are necessarily discoloured ...; conversely, in winter they (are necessarily) frozen, cold, and muddy with the snow and ice.

(Airs, Waters, Places 7, 2.26,12–17 L. = Diller 34,19–24, Transl. Adams, modified)

Throughout this passage, the qualities of stagnant waters in summer and winter are deduced both from their state as stagnant waters and from new supplies (rain water) and external influences (sun in summer, snow in winter).

This example of stagnant waters illustrates both the necessity and the complexity of the causation, since several factors are taken into consideration to explain the qualities of these waters and their cyclical evolution. The example of spring waters best illustrates the complexity of causation that the author accounts for in his physical considerations. The primary factor that explains the variety of spring water's qualities is, as we saw, their origin, i.e. the nature of the terrain from which they spring. However, there is a second factor that differentiates spring waters: their orientation to the sun and the winds. Here again, the author establishes a necessary connection between the orientation of springs and the quality of waters. For example, having said that spring waters that come from hills of earth are sweet and white, he adds: “most to be recommended are those that run towards the rising of the sun, and especially to the summer sun; for they are necessarily clearer, more fragrant and lighter” (Airs, Waters, Places 7, 2.30,9–11 L. = Diller 38,6–8). Thus, it is clear in the author’s mind that the properties of spring waters depend principally on the nature of the terrain from which they spring and, secondarily, on their orientation, which can have a positive or negative effect on the qualities necessarily resulting from the terrain. Springs facing east are best; second are springs that face north; third, springs that face west; the most harmful are those that face south. However, the author introduces a third factor for the last category. Having stated that these springs are the most harmful, he adds: “those waters blown by the southern wind are harmful, whilst those blown by the northern are better” (Airs, Waters, Places 7, 2.30,20–21 L. = Diller 38,16–17). Thus, the predominance of opposing winds adds a variable that can change the qualities of the waters, which are determined primarily by the quality of the sun, and secondarily by their orientation.

In short, the causal chain, which draws on physical causes to explain the different qualities of waters, is both rigorous and complex. It constitutes a knowledge that is prior to that of the doctor, in so far as this knowledge...
rationally establishes the elements that act upon the human body, and eventually it allows him to understand certain variables which can change these elements and their action on the human body.

In the third and final section of this paper, we will turn to the strictly medical aspect: the influence of the different qualities of waters on different states of the body.

We find that in order to define the different varieties of waters, the author uses both qualitative and normative vocabulary. His fundamental question is whether waters are good or bad for health. Different types of water are judged by their value and ordered hierarchically. The author begins by discussing stagnant waters, probably because they are most unhealthy. Indeed, he finishes this first section by saying: “Such waters are, in my opinion, harmful in all applications.” He continues: “Second to them are those which spring from rocks,” clearly showing the emergence of a normative classification. However, the author’s logic remains flexible. It is not this normative classification that organises the section on waters but, as we have seen, the principal categories that remained almost unchanged throughout Greek medicine: stagnant waters, spring waters, rain waters etc. Nevertheless, the author’s normative classification continues to be used through scattered remarks in his discussion of these principal categories. Rain waters are the best (ch. 8, ἀριστα), as long as they are boiled. However, the author also says which waters are best within one and the same category. This is the case for spring water. We saw that the qualities of spring water depend on two principal factors (the nature of the terrain and their orientation), and the author identifies the best waters according to each of these two factors: concerning the nature of the terrain, the best waters (ch. 7, ἀριστα) are those that come from hills of earth; concerning their orientation, the best springs (ch. 7, ἀριστα) are those facing east. Moreover, the discussion of the orientation of springs presents us with a complete normative classification: springs facing east are the best (ch. 7, ἀριστα); second-best (ch. 7, δεύτερα) are springs that face north; third-best (ch. 7, τρίτα) are those facing west; finally, the most unhealthy (ch. 7, φαυλότατα) are those exposed to the notos, i.e. the southern wind.

Despite this rigorous detail, and despite this unprecedented level of synthesis, the hierarchy of the different types of water and their influence on health and disease established by the normative judgements of the author

---

10 *Airs, Waters, Places* 7, 2.28,21–22 L. = Diller 36,24.
remains ambiguous. For example, which are the worst kinds of water in the absolute sense? We saw that stagnant waters, which were harmful for all use (ch. 7: μακχηρὰ πρὸς ἄπαν χρῆμα), are the worst of all. However, in his discussion of snow waters, the author uses a similar phrase and states that these are the worst waters for all uses (πονηρότατα ... πρὸς ἄπαντα χρῆματα: ch. 8, 2.36,16–18 L. = Diller 42,24–44,2). How can we reconcile these two statements? This is probably one of those questions one is not supposed to ask, and which the author himself did not ask. His logic is both rigorous and flexible.

The author is not content with such normative judgements. For each category of water, he usually points out the diseases that result from its habitual usage. This is not the place to study in detail the content of these pathological discussions, whose length and structure varies in ways that we cannot always understand. It is preferable instead to reflect on the nature of the causal link that exists between the qualities of water habitually ingested and the pathological effects that it produces in a human body.

Nosology appears as the final element in the causal chain, which begins with the origin and formation of water, moving onto the qualities of the waters and, subsequently, their influence on the constitution of human beings. Although nosology concerns living beings, the laws of causation are applied with the same rigour as they were to the cosmological domain.

With regard to the length, the section on rain water (which is, according to the author, the best water) is naturally followed by only a short sentence on possible complaints if it is not boiled. Conversely, stagnant waters (which are harmful in all uses) are followed by a well-constructed nosological discussion. However, one would expect snow waters to be followed by a long nosological discussion as well, since they are also very harmful in all uses; but the author restricts himself to the observation that these are harmful, without mentioning any of the diseases they cause. These diseases are listed by Rufus of Ephesus in Oribasius, Coll. Med. V, 3 (Raeder I, 118,11–16): “Snow or ice water, indigestible, is harmful to the nerves, to the chest and to the side, it produces convulsions and leads to spitting blood.” With regard to the structure of these nosological sections, when discussing diseases caused by waters, the author usually mentions them by name only, since he is writing above all for specialists, who are familiar with the pathology. However, with regard to the diseases caused by water of diverse origins, he discusses at length, as we have seen, the formation of stones in the bladder, i.e. lithiasis, and the strangury that results from it.

Expressions such as ‘it is necessary that’ and ‘it is normal that’ are found in the treatise in connection with the effects of water’s properties on the body or the functioning of the resulting pathological processes, and in connection with the origin and formation of the waters and their resulting properties. Here is an example where this relationship of cause and effect between the properties of the waters and the effects that they produce in the body is expressed with ‘it is normal that’ (ch. 7, 2.32,8–11 L. = Diller 38,24–40,2): “As for the waters that are best for cooking and the most emollient, it is normal that they loosen the stomach.

---

11 With regard to the length, the section on rain water (which is, according to the author, the best water) is naturally followed by only a short sentence on possible complaints if it is not boiled. Conversely, stagnant waters (which are harmful in all uses) are followed by a well-constructed nosological discussion. However, one would expect snow waters to be followed by a long nosological discussion as well, since they are also very harmful in all uses; but the author restricts himself to the observation that these are harmful, without mentioning any of the diseases they cause. These diseases are listed by Rufus of Ephesus in Oribasius, Coll. Med. V, 3 (Raeder I, 118,11–16): “Snow or ice water, indigestible, is harmful to the nerves, to the chest and to the side, it produces convulsions and leads to spitting blood.” With regard to the structure of these nosological sections, when discussing diseases caused by waters, the author usually mentions them by name only, since he is writing above all for specialists, who are familiar with the pathology. However, with regard to the diseases caused by water of diverse origins, he discusses at length, as we have seen, the formation of stones in the bladder, i.e. lithiasis, and the strangury that results from it.

12 Expressions such as ‘it is necessary that’ and ‘it is normal that’ are found in the treatise in connection with the effects of water’s properties on the body or the functioning of the resulting pathological processes, and in connection with the origin and formation of the waters and their resulting properties. Here is an example where this relationship of cause and effect between the properties of the waters and the effects that they produce in the body is expressed with ‘it is normal that’ (ch. 7, 2.32,8–11 L. = Diller 38,24–40,2): “As for the waters that are best for cooking and the most emollient, it is normal that they loosen the stomach.
Waters that are regularly drunk have a long-lasting effect on the human constitution. Stagnant waters provoke a sickly state in those who drink them, which the author describes with great clarity:

The spleen is large and obstructed all the time, the stomach is hard, emaciated and hot; and the shoulders, collar-bones, and face are very emaciated and thin (indeed, their flesh is melted down and taken up by the spleen, and hence they are thin); such people are starving and thirsty; their stomachs are very dry both above and below, so that they require the strongest purgative medicines. Their disease is congenital (νόσημα ... ξύντροφον) in both summer and winter.\(^{13}\)

Apart from the keen sense of observation and the quality of the description, which are well-known characteristics of Hippocratic medicine and which allow a fairly reliable retrospective diagnosis of malaria, what is revealing here is the expression νόσημα ... ξύντροφον. Normally translated by ‘habitual illness’, it actually refers more strongly in Greek to a ‘congenital pathological state’. Thus, man’s natural constitution is itself changed by the habitual diet of water. Although the author does not formulate it in these terms, we could say that water creates a second nature.

This permanent connection established between water and man’s constitution is presented, at least implicitly, in the form of an analogy. Man’s physical constitution is a reflection of the water he drinks, i.e. he is defined by the same elementary qualities of the water. For example, to hard waters (ch. 4: σκληρά) correspond constitutions whose cavities are hard (ch. 4: σκληράς). However, this analogy, based on the belief that these qualities are the primary elements that define things and living beings, should not lead to a simplified view of the causal relationships that the author establishes between the quality of waters and the diseases which affect those who drink them. These causal relationships are made more complex by the nature of the waters that act upon the patient and by the nature of the patient himself.

First, there is the nature of the waters that act upon the patient. Some of the principal categories of water defined by the author see their nature change according to the seasons. For example, stagnant waters are hot in summer and cold in winter, meaning that seasons can qualitatively alter the waters. This cyclic modification of waters leads to a cyclic change in the

\(^{13}\) Airs, Waters, Places 7, 2.26,18–28,4 L. = Diller 34,25–36,7.
health of men. Those who drink stagnant waters are affected by seasonal disorders, as well as their permanent sickly state: in summer, dysentery, diarrhoea, long-lasting quartan fevers; in winter, other diseases. This single example shows the complexity of the causal chain of physical influences on human health. A single factor can affect someone either directly or indirectly. An important idea found in *Airs, Waters, Places* is that climate, i.e. the alternation of the seasons, affects man directly. In particular, major changes in the seasons are the most dangerous for him. This climatic factor can also affect man indirectly through the intermediary of the waters. In the case of stagnant waters, the seasons change the water’s nature and this change determines a particular pathology.

However, the complexity of the effects produced by water on man results from the experiences of the patient rather than the nature of the waters, i.e. the diverse reactions of different individuals. The same water will not produce exactly the same diseases in the same population at the same time, and the doctor must take several variables into account. First and foremost, age and sex. In his discussion of winter diseases that afflict those who drink stagnant water, the author does not simply list a series of diseases as he does for the summer, but he differentiates diseases according to age and sex. Amongst the young, peripneumonia and delirium; amongst the old, causus; amongst women, oedema and leucophlegmatia.\(^1\) In addition to age and sex, the author also accounts for the state of man and his constitution. For example, these two other variables are noticeable in his recommendations concerning spring waters. The author begins by distinguishing between the state of a healthy man and the state of a sick man, saying:

> Whoever is in good health and strength need not mind, and may always drink whatever water is at hand. By contrast, someone who is suffering from a disease and wishes to drink the water that is most suitable for this, has the most chance of recovering good health by acting as follows.\(^2\)

When discussing the choice of spring water in case of sickness, the author mentions the variable of the constitution. He continues:

> People whose stomach is hard and prone to heating up, will benefit from water that is particularly sweet, light and clear; whilst those whose stomach is soft, wet and phlegmatic should choose the hardest, crudest and most lightly salted waters, for in this way the stomach will be best dried up.

\(^1\) *Airs, Waters, Places* 7, 2.32,3–8 L. = Diller 38,20–24, transl. Adams, modified.

\(^2\) *Airs, Waters, Places* 7, 2.28,9–12 L. = Diller 36,12–13.

\(^1\) *Airs, Waters, Places* 7, 2.32,1–3 L. = Diller 38,18–20, transl. Adams, modified.
Thus, the patient’s natural constitution determines the choice of the water to be administered according to the principle of contraries, which is found throughout the Hippocratic Corpus: soft water should be given to a patient to drink who naturally has a hard stomach; conversely, a patient with a soft stomach should be given hard water.

Consideration of a patient’s constitution is mentioned not only in therapeutic contexts, which occupy a relatively minor place in the treatise, but also in nosological contexts, which is the author’s principal concern. The same waters may or may not lead to sickness, depending on a person’s constitution. Thus, concerning the final category of mixed waters, after listing the diseases that these can cause (lithiasis, nephritis, strangury, sciatica, hernias), the author adds (ch. 9):

However, these illnesses do not affect all individuals indifferently, and this is what I will discuss. At the root of this discussion are two opposing constitutions: those individuals whose stomach is flowing and healthy, whose bladder is cool and whose bladder opening is not too narrow and does not feel any effect from the drinking of mixed waters; and those individuals who have a hot stomach, and because of this a hot bladder whose opening is enflamed, who suffer from lithiasis and strangury through drinking mixed waters.

These are the various physical and biological variables that the doctor should take into account in order to determine the influences of water on health and disease. They account both for the innate (i.e. the natural constitution) and the acquired (i.e. environmental influences) as explanatory factors of pathological phenomena. This is an interesting approach, reflected by modern medicine’s growing understanding of disease as the result of a permanent dialectic between the innate (our genetic heritage, currently in the process of a complete inventory) and the acquired (environmental influences).

What influence did this ground-breaking text have on fourth-century philosophical literature, and on technical medical literature in Greece and Rome more generally? This is an enormous field of research that cannot be explored fully in this paper. I will simply offer some preliminary remarks by way of conclusion.

16 *Airs, Waters, Places* 9, 2.38.9–10 L. = Diller 44.17.
With regards to fourth-century philosophical literature, we should note a parallel between Hippocrates and Plato that was already noted in antiquity during Galen’s time: in his Laws (5. 747 d), Plato recommends to the law-maker, when deciding on the location of a new city, that he bear in mind certain factors comparable to those mentioned in Airs, Waters, Places, and in particular the quality of the waters. In his political philosophy, Aristotle also insists on the importance of a city’s orientation and the quality of the waters for the health of its inhabitants (Politics 1330a39–b18). However, Aristotle is closer to Airs, Waters, Places than Plato because he also highlights the effect produced by water in a biological context: “Water,” he says in On the Generation of Animals (767a32 f.), “is ingested in abundance, it is present in all foods, even in solid foods”; then he adds: “hard and cold waters in some cases lead to sterility and, in other cases, to the birth of females.” The author of Airs, Waters, Places had previously highlighted that the quality of water influenced women’s fertility and had notably remarked, prior to Aristotle, that hard and cold waters cause sterility. The Aristotelian tradition, as represented in the many Problemeta inspired directly by Airs, Waters, Places, offers an explanation for the bad quality of snow and ice water which seems to come directly from the Hippocratic text; however, it did not retain the originality of its famous ‘quantitative’ experiment, i.e. the measuring of water that has been frozen and then unfrozen.

This impoverishment of the Hippocratic text can also be found in the medical tradition more strictly defined. Ancient doctors adopted the classification of waters established by the author of Airs, Waters, Places, and Charles Daremberg notes that “we find it, with small modifications, in Celsius, Rufus, Galen […] Oribasius, Aetius, Paul of Aegina, Actuarius,” not to mention the Arab doctors such as Avicenna or doctors of the Renaissance such as Ambroise Paré. This Hippocratic treatise was read, commented upon, cited and used in the medical tradition. Galen, in the second century AD, wrote a commentary on Airs, Waters, Places, preserved only in Arabic, but certain passages on waters are cited in Greek by Oribasius at

---

17 Airs, Waters, Places 7, 2.28,13 L. = Diller 36,15.
18 Airs, Waters, Places 4, 2.22,6 L. = Diller 30,25. On this connection, see S. Byl, Recherches sur les grands traités biologiques d’Aristote: sources écrites et préjugés, (Mémoire de la Classe des Lettres / Académie Royale de Belgique: Collection in-octavo; sér. 2, t. 64, fasc. 3) (Bruxelles, 1980), p. 81.
19 See Aulus Gellius, Attic Nights, 19.5; cf. Macrobius Saturnalia 7.12, 25 f. The connection was previously made by F. Poschenrieder, Die naturwissenschaftlichen Schriften des Aristoteles in ihrem Verhältnis zu den Büchern der hippokratischen Sammlung (Programm der Königlichen Studienanstalt Bamberg) (Bamberg, 1887), pp. 41–43.
the beginning of book five of his Medical Collection. A little later, Athenaeus in his Deipnosophists 2.46 c, quotes a fairly long passage from Airs, Waters, Places on spring waters. Of all the discussions of water found among ancient doctors, the one that is most comparable to Hippocrates' fundamental account is found in Rufus of Ephesus' Regimen, a Greek doctor from the first-century AD.

However, many of the rich and original elements of the discussion in Airs, Waters, Places on waters disappeared, or were blurred or simplified by post-Hippocratic doctors. First of all, this is what happened to a central part of natural science that constituted knowledge of causes of the different qualities of waters; here, the successors of Hippocrates tend to affirm rather than demonstrate. Second, the range of qualities attributed to the different waters by Hippocrates is simplified by his successors, as witnessed by the impoverishment of vocabulary describing the qualities of water. Some doctors even abandoned qualitative thinking and solely adopted the criterion of weight in order to establish a scale of waters relating to health and disease. This theory and method are discussed by the Latin encyclopaedist Celsus (2.18.12), who presents the following scale:

The lightest water is rain water; second, spring water; then, river water; and then, well water. After this, water from snow or ice; heavier than these waters is that which comes from a lake; the heaviest is that which comes from a marsh. It is both easy and necessary to know the nature of water for those who look for it. Lightness is measured through weight.

However, the inadequacy of this method, which had been advocated at an earlier date, was exposed by Erasistratus, one of the two greatest doctors of the Hellenistic period: “Some test the waters with a scale without a full investigation. Indeed, compare the water from Amphiaras and Eretria; one is harmful to health and the other not, although both weigh the same.” Finally, after Hippocrates we no longer find equal consideration of the

---

20 “Hippocrates, in his work On Places (= Airs, Waters, Places) says that the best waters are those that spring from high elevations and hills of earth; for they are clear and fresh, and can be mixed with only a little wine; in winter they are warm, whilst in summer they are cool; he particularly recommends those whose streams spring towards the rising sun, above all towards where it rises in summer; these waters are necessarily clear, fragrant, and light.”

21 The text was preserved in Oribasius, Coll. Med. 5.3 = Raeder I, 117–120. Like Hippocrates, Rufus takes into account the orientation of springs and considers that those orientated towards the east are best, whilst those facing south are harmful. He also recognises the influence of the winds on the quality of waters: “Winds,” he says, “those which come from the north or the south, will produce a considerable difference.”

22 Quotation preserved in Athenaeus Deipnosophists 2.46, b–c.
diverse categories of individuals to explain the diverse influence of the qualities of waters.

I do not wish to imply by this that Hippocrates’ successors did not add any positive or new provisions. In particular, the therapeutic aspect, which is barely present in *Airs, Waters, Places*, was later developed. However, we would not be exaggerating in saying that this fundamental text remained unrivalled for its richness of information, its power of synthesis and, above all, its sensitivity to the complexity of the effects of the different waters on the diverse categories of individuals. I would like to conclude by apologising, in front of the audience, for having once more put so little wine in my water. But I will console myself by recalling that, according to the author of *Airs, Waters, Places*, the best water is that which can be drunk with as little wine possible.