Signs and Senses: Diagnosis and Prognosis in Early Medieval Pulse and Urine Texts

By Faith Wallis*

SUMMARY. The character of early medieval medical manuscripts makes it difficult to generalize about the nature of medical knowledge in this period. In order to reconstitute one field of medical science, namely diagnosis and prognosis, while avoiding the pitfalls of unjustified generalization, this essay limits itself to reconstructing the understanding of pulse and urine inspection available in a particular place and time: the Italian monastery of Monte Cassino at the end of the first millennium. The available texts reveal little about the rationale behind these bedside techniques; indeed, pulse and urine seem to be signs without any semiotics, any underlying theory. The clue to this paradox is the fact that these texts see pulse and urine as primarily prognostic rather than diagnostic. Prognosis was understood to be analogous to forms of intuition, judgement, revelation, and prophecy that operated outside the logic of causality. Hence a fully rationalized semiotics was not regarded as necessary for effective medical practice.

KEYWORDS: diagnosis, prognosis, pulse, uroscopy, Monte Cassino MS. 97, Monte Cassino MS. 69, Alexander (of Tralles?), Hermogenes, prophecy, religion

I

How you should visit the patient

You should not visit every patient in the same way, but if you listen to all of this, you shall learn. As soon as you approach the patient, ask him if perchance he is in pain. And if he says that he is, ask if the pain is strong or not and persistent or not. Afterwards feel his pulse and see if he has a fever or not. If he is in pain, feel his pulse, which will be fluid and rapid. And ask him if the pain comes when he is cold; also if he is wakeful. And ask if the wakefulness is due to this illness, or to some other activity, and if his bowels and urine are normal. And inspect both parts, and see if there be some danger to him . . . ask about the onset of the illness, and about what the other physicians who visited him said, and whether they all said the same thing or not. And enquire concerning the condition of the body, whether it is cold or the like, whether the bowels are loose, sleep interrupted, and if the disease is persistent, and if he has ever had such ailments before. When you have enquired into all these things, it will be easy for you to discern the causes [facile eius causas agnoscit] and the cure will not seem difficult for you.

This summary guide to history-taking and physical examination is found in a handful of manuscripts dating from before or around the year 1000. One of these is a compendium made for the abbey of Monte Cassino in central Italy around the year 900, and preserved there under the shelf-mark 97.1 Here, How you should visit

* Department of History, McGill University, Stephen Leacock Building, 855 Sherbrooke Street W., Montreal, Quebec, Canada H3A 2T7.


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the patient appears within a loose anthology of medical texts, a genre characteristic of early medieval medical manuscripts in western Europe and of the medical culture in which they were made. These early medieval anthologies are quite different from Scholastic anthologies such as the Articella, which were compiled as curric-

ulum texts for the new, formalized medical instruction of the nascent universities. Scholastic curricular anthologies assembled entire texts by named authorities, and arranged them in a defined, functional order. Early medieval anthologies, however, are comparatively less stable in content and arrangement and whole texts by named ancient authorities form a relatively small component. Galen and Hippocrates, for instance, are represented by only a handful of their genuine writings, mostly works used in the elementary medical curriculum in the schools of Alexandria. Late antique handbooks of practice, especially compendia of pharmacy and materia medica, are much more prominent. Some of these are by (or ascribed to) known authors, but many are either anonymous or pseudonymous. Moreover, even authentic works were freely modified: Alexander of Tralles’ Therapeutics was abbreviated from twelve books to three, for example. Far more common than any of these are extracts, paraphrases, and creative—often one-off—re-assemblages of texts, largely anonymous.

These anthologies emphasize practical knowledge, especially pharmacy, over theory, or medical ‘science’. This preference was the product of two distinct, but interacting, western trends with regard to medicine. The first was the Roman tradition of amateur medicine, exemplified in encyclopaedias like Pliny’s Natural History and its medical ‘spin-offs’, and in handbooks of domestic medicine such as the Medicine from Vegetables and Fruits (Medicinae ex oleribus et pomis) by the third-century North African gentleman farmer Gargilius Martialis—texts which are relatively easy to find in early medieval manuscripts. Both Pliny and Gargilius deliberately eschew medical theory and privilege practical therapeutics. Their works were designed for the paterfamilias on a rural estate, responsible for the healthcare of his household and slaves, and far from the urban haunts of professional physicians. They could be, and were, easily adopted by the early medieval monastery, also a Mediterranean country estate run by a patriarch. But monks had additional reasons to favour an empirical approach to medicine. Christianity valued secular medical care as a practical necessity or as an act of charity, but it rejected certain theoretical claims advanced by the ancient rationalist physicians, for example that disease was caused and cured exclusively by ‘nature’, a divine and intelligent principle governing an eternal cosmos. For Christians, God was the ultimate source of both disease and healing. In this context, ancient physiology—the science of nature’s handiwork in


the human body—and ancient pathology—the science of the natures and natural causes of disease—were of limited interest, while therapeutics, especially druglore, was actively cultivated.5

The monk or layman who used these books may have been a man of learning, but the art he exercised was based on skill and experience, or what Plato would have termed phronesis, the craftsman’s ability to judge when to intervene so as ‘not to let the crucial moment pass’.6 The French chronicler Richer of Reims, writing in the last decades of the tenth century, describes the physician Heribrand as ‘a man of great magnanimity and learning (magnae liberalitatis atque scientiae virum)’ and also ‘highly skilled (peritissimum)’. By ‘skill’, Richer means knowledge of drugs (dinamidia) and surgery—the practice, not the theory, of medicine.7 However, many physicians seem to have practised informally, and occasionally, as an extension of a primary clerical vocation.8

The character of the early medieval medical book and its reader determines both the particular issue examined in this essay, and the method I shall adopt. The issue is this. In How you should visit the patient the goal seems to be what we could call diagnosis, ‘to discern the causes’ of disease from the non-verbal signs accessible to the doctor’s senses (e.g. pulse). Indeed, in his translation of this passage, Loren MacKinney actually supplies the words ‘of the illness’ after ‘causes’, for the hallmark of ancient rationalist medicine was that diseases have hidden causes, and therapy must be directed to these. We can further assume that these ‘hidden causes’ are imbalances in the four humours of which the body was composed: blood, red bile, phlegm, and melancholy or black bile. There is plenty of evidence, medical and extra-medical, that humoralism was broadly understood, at least in learned circles.9

Yet How to visit the patient also raises many questions. How do pulse and urine point the doctor to the causes? Why does the doctor feel the pulse, and not the forehead, to determine if the patient has a fever? More curiously, why should learning that the patient is in pain prompt the physician then to feel the pulse? Why does urine indicate ‘if there be some danger’ to the patient? What is the link between these gestures, and ‘discerning the causes’?


6 Republic, 370B.


8 John Contreni speculates that ninth-century scolastici applied their medical knowledge in informal, or at least unremunerated practice, though they were also interested in medicine as physica (natural science): ‘Masters and Medicine in Northern France During the Reign of Charles the Bald’, in M. Gibson and J. Nelson (eds.), Charles the Bald: Court and Kingdom, 2nd edn (Aldershot, 1990), 267–82. This trend increased with time: see L. MacKinney, Early Medieval Medicine with Special Reference to France and Chartres (Baltimore, 1937), p. 129.

Pulse and urine were, of course, critical diagnostic signs in the western medical tradition, emblems of the rational physician’s ability to see the invisible inner workings of the body. The rationale for pulse-taking evolved over many centuries, but the cumulative picture looked like this. Air is necessary for life, and when an animal dies, breathing and heartbeat appear to cease simultaneously. This observation, combined with the fact that the major arteries have a sinewy texture quite unlike that of the veins, but not dissimilar to the trachea, led to the conclusion that arteries carried air (pneuma). The arteries also evidently contained blood, but this blood was small in quantity compared to the blood in the veins; only a few drops trickled through the interventricular septum from the right to the left side of the heart. It was also brighter than venous blood, for it had been ‘cooked’ by the heart’s innate heat. Heart and arteries were also endowed with a pulsatile faculty. When they expanded in diastole, they drew in pneuma like a bellows, and when they were in systole, they expelled the soot formed by the coction of the blood. Physicians observed that fever patients, whose body heat is pathologically elevated, breathe faster and have a stronger, more rapid pulse: both phenomena were nature’s modes of cooling the overheated arteries. Therefore the pulse was an index of innate heat and of the functioning of the vital spirit which underlies this heat and the pulsatile faculty. Galen’s numerous treatments of pulse expanded and analysed the different kinds of pulse according to four variables: (i) ‘magnitude’, as measured along the length, breadth, and depth of the artery; (ii) speed of alternating diastole and systole (what the Latin texts call ‘leaps’ and ‘falls’); (iii) frequency, or ratio of pulses to intervals; and (iv) regularity or irregularity. Each variable conveyed specific information about the state of the vital spirit’s functioning and the body’s struggle with disease.\textsuperscript{10}

The development of physiological theories of digestion, and the incorporation of the system of the four humours into this physiology, extended the semiotic scope of urine beyond the genito-urinary system to the entire body. Galen, for example, linked the different intermittent fevers to imbalances of particular humours, which could be detected by urine. Classifying urines according to colours, textures, and sediments was one of the major projects of late antique medicine, and uroscopy emerges as a systematic diagnostic technique in the writings of sixth- and seventh-century Byzantine philosopher–physicians such as Stephen of Athens and Theophilus Protopatharius.\textsuperscript{11} The rationale behind the procedure is this. Urine is a filtrate of the blood which is concocted in the liver from chyle. During the process of sanguinification, additional moisture is added to the chyle from drink in order to make it ‘subtle’. This extra moisture is drawn off to the kidneys at the conclusion of the sanguinification, and eliminated as urine. None the less, it carries the imprint of the blood from which it is filtered. At different stages in the coction process, the humours are differentiated, and the degree of coction is shown by the colour of the cooked substance. Uncooked chyle is white; blood is red. So if there is insufficient

\textsuperscript{10} For a more detailed account, see C. R. S. Harris, \textit{The Heart and Vascular System in Ancient Greek Medicine from Alcmaeon to Galen} (Oxford, 1973).

\textsuperscript{11} See F. Wallis, ‘Inventing Diagnosis: Theophilus’ \textit{De urinis} in the Classroom’, \textit{Dynamis} (forthcoming), and literature cited therein.
heat in the liver, the urine which is filtered out of the blood will be white; too much heat on the other hand will 'scorch' the chyle, and the urine will show it by turning dark red or black. An excess of cold, wet humour (phlegm) is both the cause and the product of insufficient heat, while superabundant dry, hot choler results from, and results in, excessive heat. Therefore, the colour of the urine which the physician sees in his flask is an index of the state of the body's digestive powers or natural spirit, and a diagnostic key to humoral excess. Texture (thick or thin) provides an additional clue. Urine also contains solid matter of various shapes. These precipitates can float on the top of the urine sample, or be suspended in the middle, or lie on the bottom, and they can move around. These are signs of the local movements of humours upwards and downwards in the body.

But could the reader of How you should visit the patient have known this, especially since neither Galen's pulse treatises nor the Byzantine manuals of uroscopy were available in the year 1000 in Latin Europe? To answer this, we must rely on the manuscript anthologies, but we risk creating an unrealistic picture of the conditions under which an early medieval doctor would have laboured if we take the entire corpus of early medieval medical manuscripts as a database. In terms of the selection and state of their textual contents, these codices are idiosyncratic and local, and their readers were not trained in schools with established curricula. Hence the only valid method for answering the question posed above is to restrict the enquiry to a specific place and time.

The laboratory I propose for this experiment is Monte Cassino in the year 1000. There, a physician would have at his disposal MS. 97 (including How you should visit the patient), as well as a second volume, MS. 69, the only one of three medical codices commissioned by Abbot Bertharius in the late ninth century to survive today. Monte Cassino MS. 97 is largely composed of three text-clusters, whose contents tended (although not inevitably) to travel in each other's company as they migrated from manuscript to manuscript. The first of these, and the least stable, is a corpus of medical texts in epistolary form. This is followed by another text-cluster, the medieval recension of Galen's Therapeutics to Glaucon, with its spurious third book, and its two satellites, the Aurelius (on acute diseases) and the Esculapius (on chronic diseases), both based on the medical handbook of Soranus of Ephesus, the great methodist physician of the second century AD. Two self-contained texts come next: the commentary on the Aphorisms of Hippocrates ascribed in some manuscripts to Oribasius and probably of Byzantine origin, and the Latin adaptation of Alexander of Tralles' Therapeutics. The volume closes with another anthology, this time of pharmacological texts. Monte Cassino MS. 69 is not organized around such corpora, but has a defined structure none the less. After a pair of medical

letters comes an extensive pharmacological anthology, followed by a sequence of texts on diagnosis, prognosis, and regimen in relation to seasonal change.\(^{13}\)

In Monte Cassino MS. 97, there is only one text explicitly identified as being about pulse and/or urine: Alexander (of Tralles?) *On Pulses and Urines* (here ascribed to Galen). But in MS. 69 there are others: the *Book of Medicine from Urines* ascribed to the 'philosopher' Hermogenes,\(^{14}\) and an anonymous text beginning 'Signs of urine which is [sic] known when you leave it in the flask overnight and look at it in the light.'\(^{15}\)

II

Alexander's treatise is not only the longest of the group, but also the most popular, surviving in ten pre-millennium manuscripts.\(^{16}\) Its prologue explains that pulse and urine serve to differentiate fevers according to their 'causes, origins, species and genera', in the context of a total physical and environmental assessment:

For the patient's colour, his eyes, face, voice, silence, the position in which he is lying, the attitude of his body and his bearing will point things out to you, and, as it were, will speak silently to you. . . . In addition, you should always and in every illness take into account the quality of the region, the location of its physical features, the temperament of the air, the change of season, that patient's age and habits, the nature of his body and soul, the cause and origin, and, as well, whether the sickness arose from a defect of the body or the soul, or whether it came about externally from food, drink, or corruption of the air. . . . Hence one who exercises forethought ought to observe all these things with diligence, and he should administer therapy at the right time, in the light of circumstances foreknown and recognized [previssis atque cognitis causis], as I said.\(^{17}\)

Notice that diagnosis does not reveal the cause of the disease; ascertaining the 'cause', in the sense of agent or origin, is *part of the examination*, not its result, and we are not told how the cause is determined. The end product is, rather, prognosis—exercise of forethought in order to 'administer therapy at the right time' (echoes of Plato's *phronesis*).

Though the prologue considers fevers alone, Alexander's treatise contains thirty

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\(^{14}\) Hermogenes, *Book of Medicine from Urines*, Monte Cassino MS. 69, pp. 545a–551a/fols. 282r–283r.

\(^{15}\) *Signa urine, quae cognoscentur cum nocte in calice miseri et ad lucem videns*.


\(^{17}\) Stoffregen 76, l. 180–78, l. 37; cf. Monte Cassino MS. 97, p. 26b. Note that Monte Cassino MS. 97 is paginated rather than foliated, and 'a' and 'b' refer to columns of text. On my translation of *causa* as 'circumstance', see below, p. 276.
. chapters, only the first seven of which deal with different types of fever; the rest are
devoted to specific diseases, roughly *a capite ad calcem* (or at least *ad renes*). Some
extracts will give a flavour of the fever section as a whole:

*Acmasticon* [fever] has a pulse which is continuously very powerful, swift and coarse
(*sordidum*). A ‘very powerful’ pulse is one which pulsates to the touch of the person investi-
gating it with a strong motion in its leap. A ‘swift’ pulse is one which completes the motions
of its leap and fall in a brief time. A ‘coarse’ pulse is one which speeds up from being slow,
and slows down from being fast. . . . In all acute fevers, if the urine is livid in colour and thin
in texture, it heralds frenzy, and it declares that this frenzy will persist for a long time. Urine
of a delicate colour and cloudy in an evil way says that there is pain and irritation of the
kidneys. . . . If on a critical day it has been changed from a good to a bad colour, it shows that
death is on the way. Urine of a choleric colour, with white clouds and ‘bran’ floating on top,
says either that the illness will be protracted, or that the patient will die. . . . Urine which is
whitish or foamy or tawny, like tawny bile, particularly if the disease arose from that tawny
bile, signifies death. . . . If there is a burning fever [*estigatio*] and [the patient] refuses food and
is delirious so that he cannot understand or speak properly and evil is present [*malfactio non
desit*], then thin, black, watery urine indicates that death is at hand . . .  

Here, pulse does not detect the fever’s presence or reveal its cause, but rather is used
to differentiate the type of fever the patient has. In the context of classical fever lore,
this means establishing the time elapsing between successive paroxysms of fever: the
forceful swift pulse of this continuous fever would distinguish it from (for instance)
ephemeral fever, whose pulse is described as ‘somewhat irregular’ (*non ualde
inequalis*). The advantage to the doctor is that he can initiate treatment immediately,
without having to wait for the fever to peak again in order to confirm its periodicity.
The purpose of the pulse, then, is prognostic—determining when the fever will
peak again. Diagnosis of cause is accomplished by other means.

When he turns to the urine signs, Alexander’s style becomes aphoristic: if X, then
Y. Such formulae characterize all medical semiotics. A *clinical sign*, for instance, could
be summed up as ‘In cases of disease Y, the doctor will see manifestation X’; both
terms are known to the practitioner. A *diagnostic sign*, on the other hand, has one
unknown term: ‘If sign X appears, then one can infer that the patient suffers from Y.’
But the sign can also be *prognostic*, in which case ‘If sign X appears, Y will be the
outcome’. Urine is clearly a prognostic sign for Alexander. Indeed, Alexander does
not usually connect urine with humoral pathology; the urine which looks like
‘tawny bile’ because the disease is caused by tawny bile is a rare exception. But this
urine does not *prove* that the disease is caused by tawny bile: the doctor already knows
that. The humoral antecedent cause simply helps him to interpret the urine’s
prognostic message.

It is significant that Alexander expects the reader to be already acquainted with
the classic typology of urine colours, textures, and sediments, and so does not
explain it. Moreover, he uses non-specific qualitative terms like ‘delicate colour’,
or ‘cloudy in an evil way’, which he expects the reader to understand. One is
reminded of the language of connoisseurship—wine-tasting for instance. Terms
like ‘round’ and ‘foxy’ cannot be defined, but one can learn what they refer to by

18 Stoffregen 88, l. 88–98, l. 164; cf. Monte Cassino MS. 97, p. 28a–b.
experience. Similarly, one can know 'bad colour' or 'digested' urine when one sees it, but if one does not, one will not learn how from Alexander. In the case of the localized diseases like pleurisy, pulse retains its prognostic function. What is foreseen in these cases is that the disease is getting better, getting worse, or changing into another disease. Pulse can also occasionally be a clinical sign, one which indicates neither cause nor future outcome. Here is Chapter 18, ‘On epileptics’, in its entirety: ‘The pulse of epileptics who are not in seizure is huge [vulgus] and by its leap extends the motion of the arteries to the maximum degree of length.’ Presumably, a physician who feels such a pulse in an unknown patient could divine that the patient will have a seizure at some point, though he could not predict when. The causae which pulse and urine reveal are therefore not necessary preconditions but, rather, results, particularly results expressed as events in time, or prognoses.

III

Alexander's is the only text dedicated to pulse and urine in Monte Cassino MS. 97. However, there are two cognate texts in MS. 69. The first is a short treatise, already mentioned, which survives only in that manuscript: the Book of Medicine from Urines, ascribed to Hermogenes. Hermogenes is the name of a medical savant of the early second century, identified by Galen as a follower of Erasistratus, but this is in fact an early medieval text dignified by a classical name.

The first part of Hermogenes' book concentrates on the significance of changes in the texture of urine from subtle to turbulent and vice versa. These changes are connected to humoral dyscrasia (imbalance) but, oddly, they do not reveal the excess of any particular humour: they simply signal that one of the four humours is dominant over the other three. The author then presents in list form six possible urine colours, ranging from white, through yellow, golden, red, flame-coloured, to black. This is the classic chromatic typology of urines, and, moreover, Hermogenes treats these colours as diagnostic, that is, as signs of specific underlying humoral conditions which are agents of disease. However, the results in practice cannot be described as illuminating:

For there are many signs and kinds of illness associated with white urine. And white urine denotes dissolution of vigour, for the urine of elderly people is often white, and the urine of eunuchs is white. And there is another white urine which denotes a weakness lasting many

19 The term 'connoisseurship' in connection with pulse was suggested to me by the anthropologist/historian of Chinese traditional medicine, Judith Farquar. Particularly in his On the Diagnosis of Pulses, Galen emphasizes that perception of differences in pulse is a sort of acquired intuition, akin to judging wine, perfume, or music: Harris, The Heart, pp. 405–7. Cf. S. Kuriyama, 'Pulse Diagnosis in Greek and Chinese Traditions', in Y. Kawakita (ed.), History of Diagnostics (Osaka, 1984), 43–69.

20 E.g. ch. 11 on pleurisy: Stoffregen 111, 1.270–112,1.276; cf. Monte Cassino MS. 97, p. 31b.


days, and the blockage of the body's veins; and this illness often happens because of excessive drinking of wine. Where you see urine which is thick and white, you should know that one of the four humours is being liquefied, and that this [humour] dominates the body. And if you see urine with a strong yellow colour it proclaims that the body is sick because of red melancholy. And urine which is golden announces depletion [because?] of one of the four humours which has gained dominance over the other three. . . . If it is like a vibrant and full flame in its aspect, and if it is thick and turbulent, it proclaims that it has acquired this colour because of melancholy. And if you see red urine, it proclaims that blood has stained it red because it dominates in the body and the aspect of blood has prevailed over the urine and stained it red. . . . And black urine indicates that there is an abundance of black bile which is mixed with the urine and which passes out with it so that the body can be purified. And the black aspect in these [patients] is caused by their blood which blackens the urine because it is burnt and stains it because of black melancholy, which is stained because of the great heat which blackens it. 23

This rather obscure exposition represents a physiologist's and not a clinician's perspective on urine, for it offers a humoral explanation of variations in urine colour, but is extremely vague about what diseases result from these imbalances. Hermogenes' description of healthy urine could establish a base line from which abnormal urines might be recognized, but once again the text proves unhelpful, for healthy urine seems to lack any recognizable qualities whatsoever. 24

Of the four dimensions of urine, namely 'the liquid', 'the aspect', 'the place', and 'the time', the only one to receive detailed treatment is 'place', by which Hermogenes means the three horizontal zones of a flask of urine. Solids floating on the top of the urine are called 'clouds' (nube), while those suspended in the middle zone are 'falling [precipitates]' (procidentes), and those at the bottom of the flask are called 'flat [precipitates]' (splanationes). The text is very corrupt here, but the message seems to be that any movement of solids from one zone to another is a positive sign that the body's forces, or the doctor's treatments, are overcoming the disease. This means that all signs signify the same thing, which certainly limits the usefulness of this information at the bedside.

IV

Following Hermogenes in MS. 69 is a text which is more typical of the general run of urine and pulse texts in early medieval manuscripts: 'Signs of urine which is known when you leave it in the flask overnight and then look at it in the light.' Like a half-dozen similar anonymous texts found in other contemporary manuscripts, it consists of nothing more than a list of prognostic formulae, without even a gesture towards an explanatory framework. Sometimes there is not even a named disease involved: for example, 'Urine which is pure and has a cloud floating on top like a mist signifies impending death', regardless of any other symptoms.

23 Monte Cassino MS. 69, pp. 546b—547b.
24 Ibid., p. 548a.
Most of the rules, however, seem to apply to cases of acute fever. Occasionally the state of the urine actually diagnoses a disease. For example, ‘Urine which does not exhibit change over many hours signifies that the kidneys are suffering from a dry, heavy stone.’ The accent, however, is overwhelmingly on prognosis: life, death, swift or slow recovery, pain, or danger.\(^{26}\)

This text seems almost like a fortune-telling tract or dream-book, and the resemblance is not far-fetched, for medical manuscripts of the early medieval period also contain a wide array of iatromathematica—divination devices for medical cases. These range from \textit{lunaria}, or predictions of disease outcome based on the day of the moon on which the patient falls ill, to the so-called \textit{Sphere of Apuleius} or \textit{Sphere of Petosiris}. This is a circle bisected horizontally, with numbers inscribed in the upper and lower halves. One takes the numerical value of the patient’s name, and divides by the day of the lunar month on which he fell ill; if the remainder is in the upper half of the sphere, he will live; if in the lower, he will die. Some spheres have four or six segments, to accommodate predictions of the speed of his recovery or demise.\(^{27}\) Such devices are, of course, purely arbitrary, and the urine rules are ultimately grounded in physiological and pathological reasoning, even when that reasoning is not made explicit. But the \textit{style} of these urine rules is not very different from that of a \textit{lunare}, and the two kinds of text can be found side by side in many early medieval manuscripts.

\textit{V}

We have now exhausted all the texts expressly devoted to pulse and urine diagnosis surviving in the Monte Cassino library. But there are still some avenues open—for example the text immediately following Alexander on pulse and urine in Monte Cassino MS. 97 and labelled as Galen’s \textit{Therapeutics to Glaucon}. This is good news, for Galen’s treatise contains a sophisticated discussion of diagnostic logic and medical semiotics, and pays close attention to pulse and urine in the context of fevers.\(^ {28}\) Unfortunately, the Latin work that circulated in the early Middle Ages as \textit{Therapeutics to Glaucon} is not a translation of Galen’s treatise. It has been described as something between a paraphrase and an exegesis,\(^ {29}\) and much of the theoretical material is excised, including the semiological discussions. Moreover, this version of the \textit{Therapeutics} is one of the major sources of Alexander’s \textit{On Pulses and Urines}, which reproduces, almost word-for-word in places, virtually all of what the \textit{Therapeutics} contains on the subject of pulse and urine in relation to fever types.\(^ {30}\)

\(^{26}\) Monte Cassino MS. 69, p. 550.
\(^{29}\) Ibid., p. 97.
\(^{30}\) See notes to Stoffregen’s edition. There is no modern edition of the medieval version of the \textit{Therapeutics to Glaucon}.
There remains one potential source of information. At the close of the fourth book of the *Aphorisms*, the Hippocratic writer discusses the clinical significance of abnormal urine or urination. Monte Cassino MS. 97 contains the so-called 'Oribasius' commentary on the *Aphorisms*, and the section devoted to book 4 discusses both the nature of urine and its semiotic role. Indeed the commentary on Chapter 67 of book 4 is an admirably clear summary of the Byzantine theory of urine formation and the typology of colours and sediments. This theory is frequently applied to the urine conditions presented by Hippocrates. For example, in Chapter 70 of book 4, Hippocrates comments that limpid, white urine is a bad sign in cases of frenzy; the commentator explains that white urine is a sign of excess phlegm, which rises to the brain, filling its ventricles and attacking the meninges, and this produces frenzy. There is even a description of the anatomy of the kidneys. All things considered, the Commentaries is the most sophisticated presentation of classic uroscopy to be found at Monte Cassino. However, it would have been of limited use as theoretical background. The terminology of the *Aphorisms* does not match that of either Alexander or Hermogenes. For example, what Hermogenes calls *hypostasis* ('precipitate'), the commentator calls *depositio*, while the latter uses the term *hypostasis* for what Hermogenes calls *nubes splanchnones*. Moreover, the Commentaries usefulness is limited by the fact that it confines itself to the handful of conditions discussed by Hippocrates.

Information concerning the physiological or pathological rationale underlying pulse and urine inspection is difficult to find in early medieval texts. One often has to look outside the texts explicitly devoted to pulse and urine (for example, to the commentary on the *Aphorisms*), and even there, the discussion is of limited value. By contrast, texts labelled as 'about pulses and urines' are ubiquitous, but they are catalogues, either of diseases or of rules, without operating instructions or explanatory apparatus. Yet the number of texts, large and small, on urine and pulse inspection shows that early medieval practitioners placed considerable confidence in these practices. What is baffling is, first, how signs could function without semiotics, and secondly, why texts which made diagnosis look like divination were so popular. I can offer no definitive explanation, but the train of thought that I find most suggestive involves returning to our point of departure, the text entitled *How you should visit the patient*.

As we have seen, it is tempting to assume that the 'causes' referred to in the last sentence of *How you should visit the patient* are the hidden causes of disease in the Hippocratic-Galenic sense, and that pulse and urine are diagnostic. But medieval Latin has no verb 'to diagnose'; instead, it uses verbs of more general semantic

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31 No modern edition exists; the Renaissance edition by Günther of Andernach, *Oribasii medici clarissimi Commentaria in Aphorismos Hippocratis* (Paris, 1533), based on an unidentified manuscript, was heavily revised.

32 Monte Cassino MS. 97, p. 250a.

33 Ibid., p. 251a, in the commentary on ch. 74 of book 4.
range, like *cognoscere* or (as in the present text) *agnoscere*. In this respect, medieval writers copy ancient medical usage. The word *diagnosis* has no technical connotation for Galen, for example; it simply means knowledge, decision or judgement about *present* matters (as distinct from *prognosis* and *anamnesis*). *Causa* likewise need not mean ‘cause’ in the sense of necessary precondition or agent. It has other common meanings in classical and medieval Latin; for example, ‘attendant circumstances.’

One could thus translate that final sentence to read: ‘you will easily understand [the patient’s] condition’, or even ‘you will easily understand his symptoms.’

However, I favour a slightly archaic rendering: ‘you will easily judge [the patient’s] case.’ It captures the connotation of judgement in the word *diagnosis*, and also hints at the alternative legal meaning of the term *causa*: ‘a case in law.’ This ambiguity is reflected in the medieval and early modern English term for uroscopy, ‘the judgement of urines.’ Indeed, the catalogues of uroscopy rules are a ‘code’, both in the sense of being a system of symbols, and in the sense of being a guide to judgement, like a legal code.

Aspects of diagnosis by pulse and urine even resemble an early medieval judicial ordeal. The ordeal is a means of finding the truth about things which are hidden; for example, a crime for which there is no witness. The accused undergoes a test: he plucks a piece of iron from a cauldron of boiling water, and if his arm heals in three days, he is innocent. The logic behind the ordeal is that no crime is without its witness. God sees everything that happens, and His testimony in the ordeal will lead to exoneration or condemnation. Substitute the word ‘death’ for condemnation, and ‘recovery’ for exoneration (and, in fact, the recovery of the accused’s scalded arm is his exoneration), and one is in the conceptual world of iatro-mathematica—or of the urine rules. Indeed, the medieval *Therapeutics to Glaucon* states that pulse and urine reveal not only the kind of fever that is present, its *origo* (starting point in time), and periodicity (*temporum ratio*), but also ‘the solemn declaration [professio—a word with distinctive legal meaning] of life and death.’

It may be objected that the analogy of diagnosis and ordeal is inexact, because the ordeal is a ‘top–down’ revelation or ‘experimental miracle’, while diagnosis is a ‘bottom–up’ rational inference of the operation of natural causes. Yet, in practice, diagnosis looked surprisingly like revelation. Preceding *How you should visit the patient* in Monte Cassino MS. 97 are two texts entitled *Prognostication* and *Indications of Illnesses* (*Indicia valetudinum*) respectively. The first text also appears in Monte Cassino MS. 67, as well as in numerous other codices, some of which give it the title *The Ivory Casket* (*Capsula eburnea*). It recounts how the dying Hippocrates ordered his retainers to bury in his tomb an ivory casket into which he had placed a letter containing all the secrets of the medical art relating to the signs of life and death. Later, Caesar discovered the tomb, opened it covertly, and gave the casket

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35 For example, the medieval version of the *Therapeutics to Glaucon* uses *causa* as a synonym for ‘disease’: *Debet [recte Debet] autem sive medicus quattuor esse tempora omnium causarum, maxime februm* (The physician should know that there are four phases in all diseases, especially fevers). Monte Cassino, MS. 97, p. 34a.

36 Monte Cassino, MS. 97, p. 34a.
to his own physician Pandosius. Thereafter, thanks to its content, physicians could learn to recognize the signs of life and death.\textsuperscript{37} The content of the ivory casket is the text entitled \textit{Indications of Illnesses}, a catalogue of signs indicating impending death or recovery from various illnesses, distantly reminiscent of the genuine \textit{Prognostics} of Hippocrates, but reduced to formulae closely resembling those of the urine catalogues. Two things are worth noting here: the mystification of prognosis as esoteric knowledge conveyed through miraculous revelation; and the word \textit{indicia}, with its legal meaning of 'grounds of accusation.'

Mystifying prognosis was, of course, not invented in the Middle Ages. In \textit{On Affected Parts}, Galen tells how he first met the philosopher Glaucon on the street in Rome. Glaucon asked Galen to look in on a sick friend, for he had heard that Galen 'made diagnoses and prognoses which had more of sooth-saying (\textit{μουτρική}) in them than of medicine', and wanted to conduct a test 'not so much of you as of the medical art, to see whether it can diagnose and prognosticate such things.' As they entered the patient's house, a servant was leaving with a bedpan, and Galen contrived to glimpse the excreta; from the array of medicines on the bedside table, he silently inferred what the patient's symptoms were. Then he felt the patient's pulse, and announced that the pain was located near the false ribs on the right side. When the patient confirmed this, Glaucon, 'imagining that the diagnosis of the affected part was made by means of the pulse alone, was plainly astounded.'\textsuperscript{38}

Galen's anecdote was not known in the early medieval West, but the association of prognosis with prophesy was explicitly acknowledged. St Anthony, the fourth-century pioneer of monasticism, observed:

\begin{quote}
If, therefore, [demons] sometimes speak the truth, do not let anyone marvel at them for this. It happens also that physicians who deal with illnesses, observing the same disease in different people, offer a prognosis, frequently conjecturing from what is familiar to them. . . . Now someone would not say on this account that they are foretelling through divine inspiration, but rather, on the basis of experience and practice.\textsuperscript{39}
\end{quote}

Cassiodorus, the sixth-century Italian statesman-turned-abbot who commended the study of Hippocrates, Galen, and Dioscorides to his monks, remarked in the same vein that 'by his art [the physician] finds out things concerning a man about which he himself is ignorant; and his prognosis of a case, though founded on reason, seems to the ignorant like a prophecy.'\textsuperscript{40} Stephen of Athens, author of one of the major Byzantine uroscopy handbooks, went further, claiming that prognosis is a divine attribute which assimilates the physician, like the prophet, to God.\textsuperscript{41}

At the same time, the ascetic notion of spiritual discernment used medical semiotics as a metaphor not only of prophecy, but also of judgement. The abbot,


\textsuperscript{41} From his \textit{Commentary on the Prognostication of Hippocrates}, quoted by Temkin, \textit{Hippocrates}, p. 192.
successor to the Roman *paterfamilias*, was not only the guardian of his monks' physical health, but also their spiritual physician, who judged their inner states and apportioned appropriate discipline.\(^{42}\) Holy bishops also possessed the gift of reading the secrets of the heart, and it played a far from negligible role in their function as judges.\(^{43}\) The early medieval saint, like the physician, was known for his ability to predict the time of death, his own as well as that of others.

As the first millennium drew to a close, Ekkehard IV of St Gall related a number of stories about the monk–physician Notker's prowess at prognosis. One of these feats involved uroscopy. Notker was summoned to examine a duke, who laid a trap for the physician by substituting the urine of a pregnant woman for his own. Notker examined the urine and solemnly announced that God was about to perform a miracle: in thirty days, the duke would give birth to a child!\(^{44}\) Uroscopy, it seems, was an 'ordeal' for the doctor as well as the patient, though in this case the 'prophecy' was ironic. But how did Notker do it? Ekkehard does not say; but how does a wine expert know what the vintage is? Through the ineffable judgement of the connoisseur, an inference so instantaneous that it seems to be a perception.\(^{45}\)

The legend of the Ivory Casket can be read as a parable of medical *phronesis*, the judgement that comes from 'experience and practice', and which cannot be *learned* from books, even though it may be *recorded* in books. Again, the legal practices of early medieval Europe provide a parallel. As Rosamond McKitterick has shown, legal codes were copied in Carolingian times for the use of judges, but the law was neither defined by nor learned from these books. Law resided in the community and was known to the elders and experts from experience and tradition. The judges' codes were private anthologies which served as *aides-mémoire* and inventories of the summary points of the law.\(^{46}\) We could see the urine rules in a similar light, as more the product of a practical tradition than its source.

It can be argued, then, that it did not matter much to early medieval physicians if they did not possess a fully articulated physiological and pathological rationale for diagnosis or prognosis by pulse and urine. They lived in a religious and legal culture which was tuned to a broad band of 'signs', and which accepted the authority of symbolic and intuitive styles of interpretation which we, and even their descendants two hundred years later, reject. (The judicial ordeal was banned by the Church in 1215.) Their model of medicine therefore defined diagnosis as 'right judgement', and did not equate right judgement exclusively with deductive logic. Here again, this state of affairs would not obtain for much longer, but in the medical world of the first millennium, doctors did not learn pulse and urine diagnosis from theory, for they did not need theory to practise.


\(^{45}\) Harris, *The Heart*, p. 408.