Introduction

The importance of *Mixtures*

Mixtures is a work of central importance for Galen's views on the human (and the animal) body. It sets out his theory of the four elementary qualities hot, cold, dry and wet and their fundamental role in the natural constitution and functioning of the human organism. It also develops his influential typology of people according to the nine mixtures or 'temperaments', and his ideal of the 'well-mixed' or 'well-tempered' person, whose perfect balance ensures excellent performance both in the physical and the psychological domain.

Mixtures further teaches the aspiring doctor how to assess the patient's bodily mixture by training one's sense of touch and by means of a sophisticated use of diagnostic indicators. It also sets out a therapeutic regime based on the interaction between the elementary qualities of foods, drinks and drugs and the mixture of the human body.

Thus *Mixtures* occupies a key position in Galen's natural philosophy, physiology, pathology, pharmacology and therapeutics. In thought as well as style, the work is profoundly influenced by Aristotle, whom it acknowledges as the great philosopher. It also responds to earlier medical ideas on good and bad mixture, health and nutrition, both Hippocratic and Pneumatist, and it engages with Stoic and Peripatetic physics.

Mixtures appears here in a new translation, with substantial annotation and introduction elucidating the argument and setting the work in its intellectual context, and with extensive glossaries and indices providing a detailed insight into Galen's medico-philosophical vocabulary and conceptual apparatus.

Date of composition and place in Galen's œuvre

Mixtures (Greek *Peri kraseōn*, Latin *De temperamentis* or *De complexionibus*) was written during Galen's second period in Rome, between 169 and 176

CE.[1] It thus belongs to the same time frame as some of Galen's other central works, such as the later books of *The Doctrines of Hippocrates and Plato* (*PHP*), *The Function of the Parts of the Human Body* (*UP*) and *Natural Capacities* (*Nat. Fac.*). In terms of its systematic position within Galen's œuvre, Galen himself refers to *Mixtures* on numerous occasions elsewhere in his writings, and he often presents the work as being of fundamental importance to the understanding of his more specialized writings on therapeutics, pharmacology and pathology. The text has an emphatically didactic style, and it seems to have been envisaged as a central component of the 'curriculum' that a student of Galen's works would have had to go through prior to embarking on his medical magnum opus, *The Therapeutic Method*. In the reading order outlined in Galen's autobibliographical work *My Own Books, Mixtures* I–II is said to follow *Elements according to Hippocrates*, but to precede either *Mixtures* III and *Simples* (in what is evidently a more pharmacological curriculum), or if one prefers to omit those works, *The Best Constitution of our Bodies, Good Condition, The Uneven Bad-Mixture, The Distinct Types of Disease* (plus the following *Causes of Diseases*), *The Distinct Types of Symptom* (plus *Causes of Symptoms*), *Affected Places* and a range of other works, ending with *The Art of Medicine* (with which *Mixtures*, especially book II, shows a number of striking parallels).[2]

The reason for this centrality of *Mixtures* lies in its importance as a work of natural philosophy, medical diagnostics, therapeutics and (theoretical) pharmacology. The concept of mixture plays a crucial role in all these areas. For Galen's concept of mixture goes further than just the belief that within our bodies there are mixtures of elementary components that influence, to a considerable extent, our state of health, well-being and flourishing – which, as we will see below, was a widespread opinion among Graeco-Roman medical and philosophical writers. Galen goes far beyond this idea and holds mixtures to be the key to the understanding, maintenance and treatment of the human body. He says that it is the mixture of hot, cold, dry and wet that constitutes the nature of a living being;[3] and he holds the mixtures causally responsible for a large number of bodily and also psychological (and ethical) features of human beings and animals, both generically and on the level of individual variations. Indeed, as Galen

[1] For an overview of Galen's life and the dating of his writings see Singer (2013) 1–4 and 34–41,which takes account of the earlier scholarship on the chronology of Galen's works (e.g. Ilberg 1889–1897); see also Boudon-Millot (2007), Introduction; Hankinson (2008d); Singer (2018b).
[2] *Lib. Prop.* 6, 155,13–156,24 Boudon-Millot; *Ord. Lib. Prop.* 2, 93,18–95,4 Boudon-Millot.
[3] *Temp.* III.4, 104,1–3 H. (I.675 K.).

famously and notoriously argues in a number of places in his œuvre, it is the *mixtures* of the body – rather than the body as a whole – on which the 'capacities of the soul' (thinking, perception, memory, voluntary motion, emotions) are said to depend.[4] Thus for Galen it is the body's mixture – rather than, say, the body's anatomical structure, specific bodily organs or internal substances such as blood or *pneuma* – in which a large part of the individual nature and peculiarity of a living being finds its cause and origin.[5] Furthermore, mixtures admit, at least to a considerable extent, of management and manipulation, and in this regard they are different from other features of the human body such as anatomical structures, which are largely fixed and beyond human influence. All this explains why Galen believes that a correct theoretical understanding of mixtures and their distinct types, the practical diagnostic skill of accurately assessing an individual body's mixture by reference to these distinct types, and the therapeutic ability to manage and, if necessary, correct the mixture and keep it in a good state, are so fundamental.

Mixtures' aims may therefore be summarized as follows: to provide essential teaching about the fundamental levels of organic life and its variations, as constituted by the mixtures and their different types; to train the medical student in methods of acquiring knowledge of the body's condition, both empirically and theoretically, as constituted by these distinct types of mixture; and to teach the student how to apply that knowledge in the management and treatment of individual bodies, especially through foods, drinks and drugs.

In addition, the work touches on the psychological side of human life, for it refers to the correspondence between physiological states and moral and cognitive performance, as manifest in character traits and intelligence. It even refers, on a few occasions, to the divine and its influence on the formation of the human body.

Thus *Mixtures* presents a remarkably wide-ranging perspective on Galen's views of the nature of human beings, on what they have in common with other living things and in what ways they are different, on their place in the universe, their specific 'job' or characteristic activity, and their relation to the divine. It further represents the body–soul relationship

[4] This is the subject matter of the treatise usually referred to by its Latin title *Quod animi mores corporis temperamentis sequantur* (*QAM*), 'That the capacities (*dunameis*) of the soul depend on the mixtures (*kraseis*) of the body'; see Singer (2013) 333–423.

[5] 'A large part', for Galen recognizes that some features of the human body are not due to the mixtures but to what he calls nature's 'shaping capacity' (*diaplastikē dunamis*), or 'according to the original plan' (*kata prōton logon*); see below, p. 135 n. 137 and van der Eijk (2014a) 120–123.

as an organic, teleological connection: mixtures are instruments in the hands of nature that give rise to psychological capacities and character states, while, conversely, the latter presuppose the presence of appropriate bodily mixtures in order to be activated and physically implemented. This is a natural and purposive arrangement, provided by nature in the teleological sense of the word. Yet human responsibility has a role to play as well, if necessary assisted by medical expertise, in managing this relationship and keeping it in good condition.

In this latter regard, *Mixtures* also has an ethical, normative aspect to it, describing human nature as it ideally should be, as it is appropriate for it to be, a standard that all individual humans should aspire to. This normative tone manifests itself, for example, in Galen's belief that humans are by nature at the centre of the universe in terms of being most 'well-mixed' of all existing living things, and that the good-mixture of the human body constitutes the central norm and standard against which all other mixtures need to be assessed. It also explains Galen's sustained concern with the question which human being within the human species has the best mixture.[6]

Mixtures further considers variations between living beings, including animals and plants, in terms of higher and lower degrees of perfection and healthiness, variations that are determined by differing degrees and proportions of the elementary qualities hot, cold, dry and wet. It also addresses individual – or at any rate sub-specific, typological – variations between members of one and the same species, in particular between human individuals, both physically and psychologically. Thus, although the work is, essentially, a treatise of natural philosophy, physics or biology – since it encompasses all living bodies, including animals and plants – its anthropocentric point of view makes it in practice a work of human physiology. Moreover, it is not only concerned with physical description but also with practical instruction as to how to discern or assess bodily mixture and how to act on this, and therefore it is at the same time also a medical work, or at least a work that doctors (or aspiring doctors) will need as a guide to medical practice.

For the Galen scholar, *Mixtures* is an illuminating source of information about his views on the constitution of the body, on the nature of human beings and on the physical basis of their psychology. It is also an informative work for Galen's teleology and its relationship to the more technical, mechanical sides of Galen's physiology (and pathology); for while

[6] *Temp.* I.9, 35,18–19 H. (I.565 K.).

predominantly concerned with the fundamental, basic levels of physical organization, it explicitly addresses the question to what extent human nature, including the rational soul, is just a matter of a careful balance of elementary properties or whether there is, in addition to this, a higher, indeed divine, element that is responsible for the structural shaping of the human organism.

Mixtures is also a most informative testimony for Galen's epistemology, as it sets out a detailed account of the methods by which bodily mixtures are to be discerned, both through empirical observation and through indirect reasoning on the basis of inference from signs. Thus the work is a rich source of information for Galen's views about the relation between reason and experience. Furthermore, book III of *Mixtures* provides, in a way, the theoretical foundation of Galen's dietetics and pharmacology and thus constitutes, together with the first five books of *Simple Medicines* (*SMT*), the elemental foundation of his therapeutics by means of foods, drinks and drugs. In this regard, *Mixtures* is also a major source of information about Galen's pharmacology and 'chemistry'.

Finally, *Mixtures* provides an impressive testimony to Galen's Aristotelianism, in thought as well as style. No other Galenic work is so overtly appreciative of Aristotle's ideas, and the methodology and style of the investigation show strong similarities with the Aristotelian *pragmateia*.

Contents, scope and subject matter

Galen's concept of mixture (*krasis*) is set out in the first book of the work. It refers to the proportional relationship between the elementary qualities hot, cold, dry and wet in the bodies of living beings. Mixtures are states of the body, and of parts of the body, constituted by the proportion between the four elementary qualities hot, cold, dry and wet. These qualities inhere, first of all, in 'extreme' or 'absolute' form in the primary elements (*stoicheia*) of bodies, i.e. earth, water, fire and air, but also, in a relational sense and in combination with each other, in the higher levels of bodily organization, such as the four fundamental fluids (*chumoi*, traditionally translated 'humours') of the human body, i.e. blood, phlegm, yellow bile and black bile, as well as the bodily parts (*moria*), both the homoeomerous or uniform parts (*homoiomerē*) and the heterogeneous (*anhomoiomerē*) or organic (*organika*) parts.[7] All of these are characterized by a certain mixture of hot, cold, dry and wet.

[7] Galen's theory here represents a combination of ideas derived from natural philosophy, especially Aristotle, and the medical treatise *The Nature of the Human Being* attributed to Hippocrates, to

Thus in terms of contents, the work's subject matter is situated between that treated in *Elements according to Hippocrates*, which it is said to follow,[8] and which deals with the most basic level of elemental organization of bodies,[9] and, on the other hand, the level of the fluids, the homoeomerous or uniform and the organic parts as discussed in the *Commentary on Hippocrates' Nature of the Human Being* and *Natural Capacities*.[10] According to Galen, the bodies of living beings can be described in terms of an ascending scale of elements, elementary qualities, fluids, uniform parts and heterogeneous parts. Embedded in these structures are the various capacities or faculties (*dunameis*), such as the natural faculties of attraction, retention, assimilation, expulsion, and various other activities such as nutrition, respiration and pulsation, in which the various different kinds of *pneuma* (vital, psychic and, perhaps, natural *pneuma*) are involved as well; and on top of this physical basis, and deriving from it, are the various capacities of the soul.[11]

In addition, Galen also uses the word 'mixture' in relation to the environment and the seasons with which the body interacts, e.g. in his discussion of the seasons in *Temp*. I.2–3, and in relation to the dietetic and pharmacological substances that act on the body's mixture in nutrition and in medical treatment, which are discussed in book III. These, too, are characterized by mixtures of the elementary qualities.

From this very wide range of application, it becomes clear that in Galen the word 'mixture' (*krasis*)[12] refers not so much to a physical or chemical 'mix' of substances (such as a cake or a soup to which one might add

which he devoted a substantial commentary. In the first book of this commentary, he sets out in detail his views on the hierarchy of the elementary composition of living bodies.

8 *Temp*. I.1, 1,6–7 H. (I.509 K.).

9 A critical edition with English translation and commentary of this work was provided by De Lacy (1996); for recent discussions of some of its most salient ideas see Kupreeva (2014) and the collection of papers edited by Guyomarc'h and Marchand (2017).

10 For the former work see n. 7 above; an English translation of this commentary with introduction and notes (by R. J. Hankinson) is in preparation for the Cambridge Galen Translations. *Natural Capacities* is available in an English translation in the Loeb Classical Library (by A. Brock, 1916), and in German, French, Italian and Spanish translations (see the List of Galenic works below, pp. 186–199).

11 For an overall account of Galen's views on elementary physiology see Hankinson (2008c). On the question as to whether Galen really adopted the notion of 'natural *pneuma*' (*pneuma phusikon*) that is often attributed to him in the later tradition see Singer (forthcoming a) and Rocca (2003); see also Sharples and van der Eijk (2008) 145 n. 731 on Galen's distinction between capacities that are vital (*zôtikai*) and those that are natural (*phusikai*).

12 *Krasis* derives from the verb *kerannunai*, 'mix' or 'combine', and in the literal sense of the term in its earliest instantiation, it is used e.g. for mixing wine (with water), concocting a potion, etc. On the etymology and history of the term and its relationship to *mixis* and *meignunai* see Mirrione (2017) 240–297.

ingredients and whose texture one might influence by stirring, kneading or boiling) but rather to the underlying proportion, ratio or formula according to which the relevant components are structured and related to each other – a proportion constituted, as stated, by the four elementary qualities hot, cold, dry and wet.[13] In this respect, Galen follows an earlier tradition of medical, philosophical and also musical texts from the fifth century BCE onwards, in which *krasis* is used in this more abstract sense.[14] This proportion will vary from one genus or species of living things to another, and it can also vary between individual members within a species, or even within one individual at different stages of his or her physical development or simultaneously between the different parts of his or her body.

Galen characterizes mixtures as *hexeis*, 'states' or 'conditions',[15] so evidently they have a certain degree of stability. Yet they are not immune to change, for during an individual being's early years the mixture is in a state of flux and development before getting settled, and it continues to change with age (*San. Tu.* I.5); and mixtures can be influenced by food, drink, drugs and lifestyle in general, as Galen will point out in book III, which is devoted to the role of mixtures in dietetics and pharmacology. On the other hand, mixtures are not just incidental, episodic physiological states that change all the time, for if they were, it would not be possible to characterize individuals by reference to their mixtures or to infer someone's mixture on the basis of someone's long-term external physical features (which is what Galen does in book II).

Galen further distinguishes between connate (*sumphutoi*) mixtures and those that have been acquired (*epiktētoi*) as a result of long-term habituation.[16] We may gather from this that every human being is born

[13] Thus the mixtures that Galen regards as fundamental to the natural constitution of living bodies are in the first instance mixtures of elementary qualities, not of the elements themselves nor, as is often believed, of the humours – although Galen occasionally also talks of mixtures in this latter sense, e.g. the *melancholikai kraseis* mentioned in *Temp.* II.6, 83,4 H. (I.641 K.); *Loc. Aff.* III.10 (VIII.183 K.); *Alim. Fac.* III.1.3 (180,20–21 Wilkins, VI.661 K.); *SMT* I.33 (XI.438 K.); and *HVA* IV.63, 327,20 H. (XV.843 K.). On this point see also Moreno Rodriguez (1991). Nor is Galen's concept of mixture, as the later Latin translation *temperamentum* suggests, to be identified with 'temperament' in the psychological sense of character type or personality, for this is a post-Galenic, early medieval development of the theory of constitution types: see Klibansky, Panofsky and Saxl (1964) and (1992).

[14] For an account of the use of *krasis* in philosophical discussions of the soul–body relationship (e.g. in Alexander of Aphrodisias), see Singer (2013) 359–365. For discussions of Galen's concept of *krasis* against the background of Greek semantics and of medico-philosophical usage see den Dulk (1934); Tracy (1969); Montanari (1979); Schwabe (1980); Boudon-Millot (2011); Needham (2012); Mirrione (2017).

[15] *Temp.* I.8, 31,20 H. (I.558 K.) and II.4, 60,10 H. (I.604 K.). What follows here in the next paragraphs is adopted, in abbreviated form, from van der Eijk (2014a).

[16] *Temp.* II.4, 60,6–21 H. (I.604–605 K.).

with a certain mixture[17] that is subject to change as a result of a particular lifestyle (or, possibly, as a result of dietetic and pharmacological treatment). Galen's references to the physiology of Egyptians, Arabs and Ethiopians suggest that there is a hereditary side to the mixtures as well,[18] although this can also be a matter of climate, habitat and environment, or a combination of both, for example the latter becoming part of people's 'genetic' make-up.[19]

Not only bodies as a whole, but also bodily parts have a mixture. And there can be variation between a state in which the mixture is consistent throughout the body (*homalos*) and a state in which the body is disproportionate in its mixture (*anōmalos*) in some way or another.[20]

The next step in Galen's theory is the establishment of nine 'distinct types' (*diaphorai*) of mixture. These are, so to speak, the regular patterns that can be discerned within the potentially infinite variation of degrees between the combinations of the four qualities. The identification of these nine distinct types is the chief purpose of the first book. After a lengthy polemical discussion with other thinkers (from ch. I.2 onwards), Galen states his own theory (ch. I.8). The various possible combinations of hot and dry, hot and wet, cold and dry, and cold and wet, yield, to begin with, four simple mixtures. To say, for example, that a body is hot means that hot dominates or predominates, where 'predominate' refers either to a situation in which one quality predominates over others in a given mixture, or to a situation in which a quality in one body is in excess compared to that in another body, or to a situation in which a quality is in excess compared to a norm or standard that applies to the specific kind of living beings the individual belongs to.[21] In addition to these four simple mixtures, Galen further recognizes four composite mixtures: mixtures that are hot and dry, hot and wet, cold and dry, or cold and wet, and where both qualities predominate, i.e. are in excess in the three senses just described. Thus a body may be said to have a hot and wet mixture when its degrees of hotness and dryness are in excess compared to the other qualities, or to those of another body with which it is compared, or compared to a certain norm or standard; and likewise for the other three combinations.[22] Galen labels all these eight distinct types 'bad-mixture' (*duskrasia*), i.e. they

[17] This can be gathered from *Temp.* II.2, 43,17–44,7 H. (I.577–578 K.).
[18] *Temp* II.4, 67,27 H. (I.616 K.); 68,18–19 H. (I.618 K.); 69,2 H. (I.618 K.).
[19] *Temp.* II.6, 74,7–75,2 H. (I.628 K.).
[20] This is the subject matter of the work *The Uneven Bad-Mixture* (*Inaeq. Int.*), which is referred to in *Temp.* II.6, 85,15–16 H. (I.645 K.).
[21] Cf. *Temp.* I.6, 21,10–19 H. (I.542 K.).
[22] Cf. *Temp.* I.8, 31,3–11 H. (I.557–558 K.).

constitute a state of imbalance – although, as we will see shortly, they do not necessarily constitute a state of ill health or disease. Finally, Galen posits a ninth type of mixture, i.e. the state of good-mixture (*eukrasia*), in which the elementary qualities are all present to the mutual extent that is exactly appropriate to the species in question, as expressed by the standard that applies to that specific kind of living beings.[23]

Here, the normative, teleological aspect of Galen's mixture theory becomes manifest, as does the relevance of the mixtures, what they do and why are they so important. For Galen, and for Greek physical thought at large, the qualities hot, cold, dry and wet, whose proportion constitutes the mixture, are not just passive qualities but also active forces that exercise a particular effect – heating, cooling, drying or moistening – on the bodily structures in which they inhere and on the functions or activities carried out by these bodily structures. For example, the mixture of the brain has to be in good condition in order for the brain to exercise its characteristic activities such as cognition and locomotion; or the stomach and the blood vessels require a good, appropriate mixture for the exercise of nutrition and digestion. Therefore, the mixtures have to be in the right state in order to facilitate the appropriate physical mechanisms and in order for them to operate smoothly. All being well, this goodness or appropriateness is provided and enabled by nature, but there is also a role to play for human management: mixtures are accessible to therapeutic intervention and correction, which may be needed when the mixture departs from its norm as a result of disease or an unhealthy lifestyle.

Thus mixtures are effective in giving rise to specific physiological and also psychological capacities and in promoting their performance. In terms of health and disease, the one good-mixture and the eight bad-mixtures are to be understood as points on a scale: health and disease admit of degrees, Galen explains, and these express themselves in higher or lower levels of performance of physical and psychological capacities.[24] Thus it is not that all human beings with a 'bad-mixture' necessarily suffer from some kind of ill health, for we only speak of disease when the specific capacity of a bodily part is damaged to such an extent that it is impaired in its functioning, and when this is accompanied by a sense of pain, as Galen argues elsewhere (*San. Tu.* I.2–5). Yet one may presume that people with a bad-mixture are more susceptible to ill health and disease as a result of their constitution.

As we can see, Galen's mixture theory, as his theory of health at large, is performance-related: good-mixture is that which facilitates good activity

[23] *Temp.* I.8, 31,17–32,4 H. (I.558–559 K.). [24] *Temp.* II.4, 63,3–19 H. (I.609–610 K.).

(*energeia*) of the relevant functions or capacities. It is therefore of vital importance for the doctor to be able to identify good-mixture or bad-mixture and if necessary to act on it.

In order to do so, one needs to have a thorough grasp of what Galen refers to as the relevant standard or yardstick (*kanōn, gnōmōn*). A large part of *Mixtures* is devoted to this epistemological dimension of the topic: how to identify the good-mixture as a standard against which other mixtures have to be measured, how to recognize it in practice and, more broadly, how to assess individual mixtures, both in their own right and in relation to this standard. Yet before considering this diagnostic aspect of the work, a few more remarks on the role of mixtures within Galen's anthropology are in place.

Mixtures, Galen's anthropology and the role of the divine

Following on from the connection between mixture and activity, Galen proceeds to argue that the constitution of the body of a living being is teleologically suited to the exercise of the characteristic activities of that living being; and these characteristic activities are in turn related to the soul of that living being, which has characteristics that distinguish it from other living beings.[25] These differences exist, first of all, between different species of living beings (humans, dogs, sheep, etc.). The characteristic aspect of humans is that they have reason; their bodies are therefore so constituted as to facilitate and promote the exercise of reason. There is a clear teleological connection here, similar to what we find in Aristotle's *Parts of Animals* IV.10,[26] with a correspondingly broad biological perspective, encompassing not just humans but also other species.

Yet having posited, without much in the way of argument, that humans have the best mixture of all living beings because they occupy a central position, in terms of mixture, within what Galen refers to as 'the totality of existent objects',[27] Galen proceeds to consider which being has the best mixture within the human species.[28] For, as he points out, there are significant variations within the human species as well. Which human being has the best mixture is a question, Galen says, that is extremely

[25] *Temp*. I.6, 23,29–24,15 H. (I.546–547 K.); I.9, 35,28–36,6 H. (I.566 K.).
[26] Aristotle's *Parts of Animals* is referred to in this connection in I.9, 36,5 H. (I.566 K.). On its significance for Galen in general see Moraux (1985).
[27] *Temp*. I.6, 23,12–16 H. (I.545 K.); 25,11 H. (I.548 K.); I.9, 32,7 H. (I.559 K.); 32,25 H. (I.560 K.); 35,13–14 H. (I.565 K.).
[28] *Temp*. I.9, 35,18 H. (I.565 K.).