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Patricia Baker *Tastes and Digestion: Archaeology and Medicine in Roman Italy*

Taste and the Ancient Senses

Edited by Kelli C. Rudolph

The Senses in Antiquity

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Tastes and Digestion: Archaeology and Medicine in Roman Italy

Patricia Baker

In the fourth or fifth century CE a collection of recipes from unknown writers was compiled under the pseudepigraphical name Apicius. Apicius supposedly lived in the early first century CE and like some of the literary figures discussed in previous chapters, was renowned for his luxurious lifestyle and flamboyant taste in food.[1] Since his name was attributed to this collection, there is an underlying assumption that the recipes, like the character of Apicius, were extravagant and intended for high-status Romans, such as those associated with the imperial family and senatorial class. Yet, the preparation for the dishes is generally uncomplicated, and in comparison to the archaeological remains of food from Roman Italy, discussed below, the majority of the ingredients were readily available and likely to have been consumed by people from all classes of Roman society. Consequently, Grocock and Grainger maintain that many of the dishes in the collection were intended for what they term the middle classes, including, for example, builders, shopkeepers and farmers. They also suggest that the recipes might have been taken from popular dishes served in taverns (*popinae*), likely frequented by Romans living in small houses and apartments with little or no space for cooking.[2] Thus, closer examination of these recipes not only allows us to dispel some of the myths and/or exaggerations of garish Roman eating habits, but also permits us to ascertain what other conceptions the Romans might have had about food and diet.

Interestingly, six of the recipes in the collection recommend dishes for good digestion. One section is labeled "Easily Digested Relish" (*Pulmentarium ad*

[1] The gourmand, Apicius, is mentioned in a few ancient sources: Martial, *Epigrams* 3.22, 10.73; Athenaeus, *Deipnosophists* 1.7a–d, 12.543c. Some recipes attributed to him are described in Pliny the Elder's *Natural History – Historia Naturalis* 9.66, 10.133, 19.137. For a further discussion of Apicius' life see Grocock & Granger (2006: 54–8). For more information about how ancient physicians and the public understood diet, medicine and health see King (2005); Nutton (2013); van der Eijk (2005); on medical recipes see Totelin (2009); for further studies related to diet and health see Craik (1995); King (1995); Nutton (1995). For broader studies on food in the ancient world see Wilkins et al. (1995); Wilkins & Shaw (2006). See also Gowers (chapter five) and Banducci (chapter seven).

[2] Grocock & Granger (2006: 24–5). See also Garnsey (1999) for a discussion of food and class.

Ventrum) and includes four optional recipes.[3] The first calls for boiled, chopped beets and stored leeks, but could also be prepared with polypody, the root of the oak fern known for its purgative qualities. After arranging the vegetables in a dish, pounded pepper and cumin mixed with *liquamen* and *passum*[4] were poured onto the vegetables so that they were sweet (*ut quaedam dulcedo sit*). This was boiled and then served.[5] The other recipes that Apicius recommended for good digestion, which will be described below, called for a number of the same ingredients: cumin, salt, *liquamen* and beets, which differs from many other recipes in the collection that call for other herbs and condiments like thyme, oregano and lovage. Their preparation also meant that they shared the same food flavours: sweet and/or salty. The recipes establish that the Romans were mindful of a connection between food and health, particularly in regards to the digestive process. This example also suggests that the Romans believed certain foods had beneficial properties that were recognized by their flavours.[6] Since this is one writer's opinion, we will examine a range of texts to determine if there was a wider held medical perception about the perceived relationship between the digestive properties of foods and their flavours. Two questions are therefore addressed in this chapter. First, was the apparent link between the food flavours and their powers suggested by Apicius substantiated by other writers in their food descriptions? Second, in relation to the first question, did Roman medical writers and authors of other genres of literature describe foods that were readily available or ones that were difficult to obtain?

To determine whether the foods mentioned by ancient writers were common or exotic, this chapter compares the food remains found in the archaeological record with literary and technical treatises of the first and second centuries CE. Just as Banducci, explored the interplay of material and metaphorical tastes in the developing notion of what it is to be "Roman" in the early Republican period, here I wish to examine the reciprocal nature of flavour in creating a communal identity and notions of health. Due to the eruption of Mount Vesuvius in August 79 CE, the ancient cities and villas located around the Bay of Naples were covered in mud and ash, creating

[3] Although not directly related to the discussion in this paper, see Lejavitzer (2006) for a classification of Apicius' recipes regarding health.
[4] All untranslatable food entries are italicized in the text. *Liquamen* is thought to be a fish sauce that might have had a sweet flavour. *Passum* was a sweet wine derived from raisins, see Grocock & Grainger (2006: 356–7) and Dalby (2003: 250–1).
[5] Apicius, 3.2.1.
[6] See Totelin in this volume for a discussion of flavours and medical remedies.

excellent conditions for archaeological preservation. Included amongst the finds are a variety of preserved food and bodily remains that reveal the common diet and general health of the people who lived in this area. By comparing this evidence with the works of roughly contemporary medical writers such as Celsus (first century CE) and Galen (second century CE), it is possible to see the extent to which their treatises and comments about diet were based on foods that were eaten by most people. In particular, we will explore attitudes towards food and flavour in Galen's *On the Properties of Foodstuffs* (*De alimentorum facultatibus*) and *The Thinning Diet* (*De victu attenuante* or *De subtilante dieta*)[7]. Along with these technical medical treatises, other genres of literature mentioning food and diet, particularly Athenaeus' *Deipnosophists*,[8] are also examined to establish whether the properties of foods were recognized by their flavours beyond the medical sphere.

Health, Nutrition and Diet in the Ancient World

Since one of our concerns in this chapter is to determine the healthful benefits of foods along with their digestive properties, a brief explanation of the Roman notions of health, diet, digestion and nutrition are presented. These four terms are grounded in Roman conceptions of the body that were different to modern-western medical classifications.

Beginning with the term health, King notes that most of the written information available from the period was concerned with the causes and cures of physical ailments rather than descriptions of health.[9] It could be argued that the definition can simply be the opposite of descriptions of illness and disease. However, this would overgeneralize the concept. Moreover, Greco-Roman medical works are also largely concerned with daily regimen; it is evident that the state of health in the ancient world was holistic and dependent upon a person's environment, daily habits,

[7] See Wilkins (2002) for a discussion of the historical context of *The Thinning Diet*. This work does not appear in Kühn's collection of Galenic texts because it came to the west in 1840 (Wilkins 2002: 47).
[8] Athenaeus' work mentions a number of doctors and medical ideas about food, drink, particularly wines and diet. The ideas presented in the text are similar to the ideas found in medical texts. For a discussion of the medical ideas in the text see Flemming (2000).
[9] King (2005: 1–9).

age, gender, mental condition, humoral mixture, diet and exercise.[10] Ultimately, someone was healthy if there was balance both within the body and in daily aspects of life. Internally, this also included the idea that the body contained an equal proportion of the four humours and their associated properties: yellow bile (hot and dry), black bile (cold and dry), phlegm (cold and moist) and blood (hot and moist).[11] If this balance was disturbed, it was treated with something that contained opposite qualities. For example, if someone had an excess of cold and dry black bile, warm and moist foods and drinks were given to the patient. Moistness would counteract the dryness, and warmth the coldness of the bile. This idea originated in the Hippocratic texts dating to the fifth century BCE, and was refined over time. Eventually, each humour came to be associated with a season, age group and personal temperament. For example, black bile was linked with autumn, adulthood and a melancholic personality.

Besides an internal imbalance, the humoral equilibrium was also affected by external environmental factors and personal habits. These factors were divided into six entities by Galen, which came to be known as the six non-naturals.[12] These included diet, air quality, sleeping and waking, motion and rest (exercise), emotions and excretion. Ideally someone with a good regimen lived in an area that was free from noxious air, had a well-balanced lifestyle that included adequate exercise, sleep and diet and had a balanced mind and digestive system. These factors also affected people in accordance to their gender and age. For example, Galen's work *On Hygiene* recommends various routines for exercise, bathing, sleeping and eating for people at different stages of their lives: childhood, adulthood and old age, to improve or maintain their state of health and development. The gender division between male and female that became fully apparent at puberty was marked with differences in suggested diets and exercise that would affect the humoral mixture of the male or female body, since according to ancient medical tradition, the male was warmer and drier than the female.[13]

[10] See, e.g. Hippocrates *On Regimen – De diaeta*; Galen, *On Hygiene – De sanitate tuenda*. See Bartoš (2015: 12–99) for a review of Hippocratic diatetics.
[11] See Nutton (2013) for a general overview of the system. It was not until Galen that there was standardisation in the humoral system. For a discussion of humoral variety in the Hippocratic texts see King (2013).
[12] For discussions of these, see Hankinson (1987) and van 't Land (2012).
[13] Wilkins (2015: 59–61).

Of the six non-naturals, diet and digestion received significant discussion throughout Galen's work on regimen. He showed that a food's quality could be beneficial for some people and harmful to others because of the way it interacts with an individual's bodily mixture. For example, honey would convert to bile in people with hot bodies and to blood in those with cold bodies. As a food, it also had some bitterness, which could stimulate stomach emptying.[14] Thus, a single food could provide nourishment for one individual, while harming another. Honey also had the power to assist in emptying the body for most individuals regardless of their humoral mixture. Galen's work demonstrates the extent to which ancient physicians considered various factors in both the food and the body when prescribing nutritious diets.[15]

Another role the diet played in the ancient medical tradition was to replace nutriments that escaped from the body. The properties of the four humours that made up the human body were also contained in anything that was incorporated into or evacuated from the body.[16] In essence, Galen argued that lost nutriments had the same nature of the particular part of the body from which it had come, such as the liver or stomach. Although food and drink replaced nutriments, they were not believed to contain the exact qualities of each part of the body they replaced. Thus, foods and drinks were converted into the nutritional qualities necessary for health by a process referred to as concoction (*pepsis*) in the stomach.[17] Although concoction, according to Galen, made the nutritional qualities of foods available to the body, these foods could not be transformed into a humour that differed from their own nature.[18] This meant that a cold, moist food maintained its properties. For example, we see this when Galen describes the cucumber as a cold and moist vegetable. Because the cucumber has these basic humoral properties, it could never the concocted into warm and dry properties. Galen also reports that the cucumber acts as a diuretic, but this effect is limited to those with a physical disposition of a certain kind. He continues that

[14] Galen, *On the Properties of Foodstuffs* 3.38 (6.740 Kühn). For further discussion of honey see Totelin (this volume).
[15] See Totelin (2009) for ingredients used in medicinal recipes for a comparison with food recipes.
[16] Nutton (2013: 247).
[17] Powell (2003: 15, 23) provides an overview of Galen's description of the digestive process. Galen maintained that the stomach acted like an oven, heating the food and drink that were ingested and transforming them into a fluid (*chymos*). In Greek this process is referred to as *pepsis*, which is often translated to concoction, though sometimes, digestion. Outside of medicine it can be translated to cooking and changing by heat. See also Totelin (this volume).
[18] Galen, *On the Properties of Foodstuffs* 2.6 (6.568 Kühn).

cucumber aids urination and cools and moisturizes those of a bilious nature, but they were not advised for those with a phlegmatic constitution, which was cold and moist. Even people who could concoct them easily were warned not to eat them in excess because a cold, thick humour would build up in their body and eventually cause malignant fevers.[19]

Any food or drink that was not fully absorbed and integrated into the body was evacuated from it as urine or excrement. The evacuation process could also be assisted by the properties of the foods themselves, just as the bitterness of honey stimulated the emptying of the stomach. Bitter foods in general, as we will see, helped to cut thick humours and aided in their elimination. Hence, food and drink aided the digestive process in two ways: first, by helping to add nutrition to parts of the body and second, through the purgation of unnecessary humours and waste.

Since foods were required to provide nourishment to various parts of the body, each with its own humoral character, the question arises: how were these properties recognized in food and drink?[20] Unlike modern western understandings of the nutritional properties of food and drink that are determined by chemical analysis for their vitamin, mineral, fat and carbohydrate content, physicians in the ancient world depended on their senses to identify the humoral properties of their foods. According to Galen food powers were recognized by the senses, in particular, taste and smell.[21] Taste and smell are closely linked, but food flavours are referred to in two ways. First, they may *signify* a food power, in other words, they are a marker for a power that exists in the food. Second, some authors seem to suggest that flavour *was* the power of the food. For example, either sharp, salty and bitter flavours *themselves* had a biting and cutting effect, beneficial for thinning the humours.[22]

Definitions of healthy diets and the identification of the powers of foodstuffs is ubiquitous throughout the world, but varies greatly between groups of people, as shown in anthropological studies on food and eating habits.[23] The definitions differ because of socio-cultural beliefs about the body and its care, food taboos and the

[19] Galen, *On the Properties of Foodstuffs* 2.6 (6.569 Kühn).
[20] For general discussions of diet and food properties in ancient medicine see Craik (1995); King (1995) and Nutton (1995).
[21] Totelin (this volume) for taste as a medical tool. See also Totelin (2015a), who explains how Greeks and Romans believed noxious smells could cause humoral imbalance and carry disease. If emanating from a person, such smells were symptomatic of illness. Sweet smells, by contrast, indicated health, and pleasant perfumes were used to restore balance.
[22] Galen, *On the Thinning Diet* 3–4.
[23] See, for example, Counihan (1999); Levi-Strauss (1966).

practical issue related to the types of foods available to people living in certain areas.[24] Organoleptic characteristics, qualities which are perceived through the sense organs such as taste, visual appearance, sound, smell and tactile sensations (like food temperature and texture), are commonly used both to identify the beneficial properties of plants and animals and to determine their nutritional and medicinal values. Sensory experiences, particularly those of taste, are highly subjective, but they are similar enough for one group of people to understand, for the most part, what is being described by another.[25] Etkin pointed out that four classic tastes have been recognized in most anthropological studies on food and medicinal remedies: sweet, sour, salt and bitter. Others are described to varying degrees such as astringent, pungent and harsh.[26]

In some cases there are flavours that are culturally specific, and we in the west do not have precise words to translate the meanings expressed in the descriptor. For example, the Japanese flavour *umami*, as Rudolph discusses in the introduction, roughly translates to delicious savory taste. Interestingly, a Japanese study of the residue remains found in Pompeiian *dolia* (storage pots) of *garum*, a popular Roman fish sauce used as a condiment, observed that the sauce had a similar pattern of amino acids and a high content of glutamate that is comparable to *umam*i tasting fish sauces found in southeast Asia and southern Italy today.[27] So when the Romans recommended the foodstuffs *garum* or *liquamen* as a flavouring, the words themselves were, perhaps, a specific taste indicator with its own beneficial properties, like *umami*. Indeed, these condiments are mentioned throughout Apicius' recipes, and in some instances the reader is informed that these are sweet or salty.

This overview demonstrates that a balanced diet, in accordance with the humoral system, was fundamental to ancient conceptions of nutrition and digestion that ultimately played a part in an individual's health. Diets were prescribed in respect to an individual's humoral mixture. Foods with specific properties were recommend to assist in balancing the body, and their properties could be recognized by the sense of taste. Yet, to better understand the Roman classification of food, tastes and their

[24] See, for example, Counihan (1999); Manderson (1986).
[25] Etkin (2006: 30).
[26] Etkin (2006: 31).
[27] Smirga *et al*. (2010).

powers it is essential to know what was actually eaten, which is evident in the archaeological remains from the Bay of Naples.[28]

Archaeological and Epigraphic Evidence of Foods from the Bay of Naples

In Pompeii, houses tend to be named after groups of artefacts or paintings found in them. One such house is that of the Fruit Orchard, so called because it has a fresco painting of an orchard (area I. 11.5). Represented on it are peach or pomegranate, fig, apple, cherry, lemon, pear, plum and quince trees.[29] The diversity of fruits would seem to be an idealized depiction of a Roman garden. However, von Stackelberg as well as Horden and Purcell argue that gardens in the Mediterranean were intensively and diversely planted.[30] Agricultural treatises from the first centuries BCE and CE recommended planting an assortment of crops. For example, Columella thought a garden should have herbs, onion, leek, cucumber, cabbage, fennel, mint, dill and parsley.[31] Von Stackelberg contends that this recommendation was likely for those with larger gardens; however the majority of people would have had smaller ones. Her premise is based on a complaint by Martial about a small parcel of land. In his satire, he grumbles that the plot is so small that he could find more space to grow plants in his window, perhaps implying a window box.[32] Martial mentioned having various plants in this small garden: rue, green pepper, cucumber, mushroom, figs, roses and violets. It is uncertain whether all of these were grown. However, his comments suggest that others may also have had small areas of land, or perhaps even window boxes to grow food and flowers. Although the literature alludes to gardens containing a variety of edible plants, the archaeological remains from Pompeii and Herculaneum give a truer impression of what was grown and eaten in Roman Italy.

The types of plants grown at both sites are identified through various archaeological methods: root casts, archaeobotanical studies of soil samples containing pollen, nuts, seeds and small bones, carbonized foods, remnants from cesspits, coprolites, pottery residues, inscriptions as well as skeletal and dental

[28] The archaeological evidence for food remains is limited, which makes the surviving evidence from Pompeii especially important, both for my study and those of Banducci and MacKinnon in this volume.
[29] von Stackelberg (2009: 43).
[30] von Stackelberg (2009: 43); Horden & Purcell (2000: 220–1).
[31] Columella, *On Agriculture – De re rustica* Book 10.
[32] von Stackelberg (2009: 45); Martial, *Epigrams* 11.18.

remains. Each of these contributes to our awareness of the common flora and fauna in the region and what was determined to be edible. For a general reference, a full list of edible remains found at both sites is presented on the table below.[33]

One of the earliest methods used in archaeological excavations for identifying the layouts of Roman gardens was taking root casts. Making casts of plant roots involves filling the voids left by biological remains in the hardened lava and soil with plaster. Once dried, the archaeologist chips away the lava and soil to see the cast. It is most famously used for identifying people, but Jashemski, an archaeologist whose research focused on Roman gardens, used this method to determine garden design and, with varying success, the type of plant that was grown from the shape of its roots. For the most part, the molds are useful for establishing garden layouts. For example, casts taken at the Inn of Euxinus (area I. xi 10–11) revealed a vineyard containing at least thirty-two vines planted in irregular rows. Also found in the garden were two large pottery vessels embedded in the ground, suggesting wine production.[34] Other fruit bearing trees were identified throughout the region from the fruits found next to the casts: almond, crab apple, cherry, chestnut, date, fig, olive and possibly a lemon, but more likely a citron (Table 8.1).[35] If no carbonized fruits are found with the mold, the root cast method of identification is less reliable than archaeobotanical studies of soil remains, which have become commonly used as a method of flora identification in archaeological science, as Livarda demonstrates in chapter ten.

Since 1994 the Research Laboratory of the *Soprintendenza Archeologica di Pompeii* has been examining soil samples from Roman sites in the bay of Naples, for which a full list of the pollens and carbonized seeds and fruits are given in the appendix of Ciarollo's *Flora Pompeiana*.[36] The edible plants (Table 8.1) range from grasses (wheats, barley); nuts (hazel, walnuts, chestnut and almonds); beans, pulses and peas (chickpeas, fava beans, peas and lentils); fruits (apple, mulberry, peach, quince, pear and cherry); vegetables (beets, cucumber, cabbage, leeks, onion, purslane, radish, rocket and fennel); and herbs or spices (garlic, bay and fenugreek).

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[33] Livarda's study in chapter ten is an excellent example of how botanical remains can enrich our understanding of ancient taste and its social context. See also Banducci's discussion of Roman identity and its relation to the environmental remains in the previous chapter.

[34] Dimbleby (2002: 185); Jashemski (1993: 51–2). See Boulay (this volume) on wine analysis and production methods.

[35] Jaskemski (1993: 60, 62, 69, 90, 95, 249, 288, 295, 297, 300). Citrons have a thicker skin and pith than lemons and are very aromatic. Their zest is used for flavourings, much like dried orange or lemon peels. See, for example, Dalby (2003:88).

[36] Ciarallo (2004: 197–203, 212–56).

The fruit trees identified in soil samples and Jashemski's study correspond to those found painted on the fresco found in the House of the Fruit Orchard, indicating that it was a realistic representation of the trees grown in the region. Although small bones and shells are sometimes found in soil studies, most of the evidence for these animals comes from excavations.

Shells and bones were excavated in the garden belonging to the House of the Wedding of Alexander (VI.42), for example. The bones found here were from chicken and birds which could be used for meat and eggs; cow and sheep or goat, which could be for dairy or meat; and pig or wild boar, likely raised or hunted for its meat.[37] Included among these were two unspecified fish vertebrae and unspecified shells.[38] Throughout both cities, evidence for domestic cow, sheep and/or goats, pigs and/or wild boars and rabbit were found (Table 8.1). Along with these were the bones of other animals: domestic horses, cats, dogs, dormice, weasel and voles.[39] Although these other animals are edible, they are rarely mentioned as foods in medical texts except when Galen speaks of what other groups of people ate.[40] For this reason, we will not be looking at them closely. Along with bones, the shells of edible shellfish found in the gardens were small clams, murex, scallops, cockles and sea urchins (Table 8.1).[41] As we have seen in Banducci's discussion in the previous chapter, faunal remains of this sort can help us understand the identity of a population, but it also helps us better understand ancient taste, as MacKinnon explores in the next chapter.

The flora and fauna attest to a variety of available foods, but other sources of evidence provide a better indication of how it was prepared and what was actually ingested. Carbonized bread, buns and nuts were discovered in houses, showing how plants known from pollen samples were either prepared for consumption or, as in the case of carbonized walnuts, eaten after being harvested from the tree. The remains of flourmills and bakeries in both Pompeii and Herculaneum are further evidence for

[37] See also Banducci and MacKinnon in this volume for a discussion of animal husbandry and meat consumption in Roman Italy.
[38] Jashemski (1993: 491).
[39] Jashemski (1993: 407).
[40] Galen mentions that other societies ate dog, particularly young, plump castrated ones. In terms of health benefits he says that some physicians held them in high regard Galen, *On the Properties of Foodstuffs* 3.1 (6.664–5 Kühn). Of course, Apicius' recipe for dormice (8.9) is well known, but the animal could also have been considered a pest, so it is difficult to determine the extent to which the presence of dormice bones reflect dietary habits.
[41] Jashemski (1993).

food preparation.[42] For example, recent excavations under the *Insula Orientalis*, which contained an apartment block/tenement running along the southern side of Cardo V in Herculaneum confirms what people ate and allows us to see where and how food was prepared. Moreover, it also gives us some insight into the multi-sensory fabric of the ancient city.[43] This excavation revealed a sewer that has no evidence of a flow of water that would have emptied it; thus it was likely a cesspit. This pit was half full when it was covered by ash, which helped preserve the biological remains that had been discarded. The cesspit was placed under a group of houses in Herculaneum that presumably belonged to workers and shopkeepers because the *insula* also exhibits remains consistent with a *taberna*, a fullers and a bakery sited amongst the domestic structures.[44] Likewise, the toilets belonging to the houses, usually placed next to kitchens, emptied directly into the cesspit. Besides their intended function, toilets were also convenient for disposing garbage, such as scraps of food.[45] The disposed waste is clear evidence for what was ingested and prepared by the people living in the houses above the sewer. The finds include eggshells, pips and seeds, chopped animal bone, seashells, copious fish and bird bones and sea urchin. Charcoal was also found amongst the waste, which also reveals something about the process of cooking and/or heating the inhabitants were using. The bones include those found in Pompeii: domestic fowl, sheep and pig. While the edible mollusks are limpets, Noah's Ark clams, dog cockle, mussel, queen and pilgrim's scallop, murex, thorny oyster, wedge shells and cuttlefish. Small fish bones were recognized as flatfish, haddock/cod, sea bream, Mediterranean anchovy, Mediterranean horse mackerel and drums (Table 8.1).[46] The coprolites, remnants of human bodily waste, had the remains of fig, grape and mulberry pips and tiny fish bones in them.[47] In combination, all of the archaeological evidence demonstrates that the Romans in the area had access to and consumed a range of foods. Incidentally, the social level of the people living above the sewer were in the class for which Grocock and Grainger believe Apicius' recipes were intended, and the foods found are consistent with many of the recipes in the collection.

[42] Wallace–Hadrill (2011: 276); Wallace–Hadrill (1994: 135).
[43] See Koloski-Ostrow (2015a), for example.
[44] Robinson & Rowan (2015: 107).
[45] Koloski-Ostrow (2015a); Koloski-Ostrow (2015b: 95); Robinson & Rowan (2015: 113).
[46] Robinson & Rowan (2015: 111).
[47] Wallace–Hadrill (2011: 283–5).

[INSERT TABLE 8.1 HERE]

Besides the archaeological evidence for foods, epigraphic remains also inform us about what was available, how foods were prepared and stored and where foods were obtained. At least three inscriptions from Pompeii have foods listed on them. One inscription listed foods under individual days and was found in an atrium with serving counters in it, indicating that it was a tavern.[48] Next to the food were numbers, which likely indicate the cost of each item. The foods were basic staples such as oil, bread, cheese and wine. A distinction between bread types was made on the inscription. "Bread for slaves" was mentioned three times, "plain bread" was listed twice and "bread" was mentioned six times. It is possible that the difference was based on the grade of flour used in the manufacturing process.[49]

The second inscription was found in the large *palaestra* of Pompeii. It, too, had the same items listed on it: wine, bread, oil and cheese.[50] The location of the inscription suggests that it was from a market stall. A small landowner or someone living in an apartment was unlikely to have had the facilities to bake bread or make wine, cheese and olive oil. Thus, they would have had to purchase these items. These were likely processed in the area, given the mills and bakeries already mentioned.

An intriguing list of food with a steward or land agent mentioned on it was found as graffito placed on a wall of a room in a dwelling, thought to be a bedroom.[51] Rooms in ancient houses were multi-functional, so the space could have had other purposes; in addition to being a place to sleep it could also have functioned as a workspace or even as a sitting area. Foods might have been sold from the room because numbers were written next to each entry, again suggesting prices. The numbers next to the items could also indicate that the graffito was a distribution list for those working or living in the household, given that a steward or land agent is mentioned on it. Along with firewood, the foods recorded were bread, cabbage, beetroot, mustard, mint and salt. These foods, as the pollen remains suggest, were probably grown in the area or the garden of the house.

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[48] *CIL* IV. 5380; Pompeii, area IX. VII. 24–5; Cooley & Cooley (2004: 163).
[49] See Mayeske (1979); Mayerson (2002). Athenaeus (*Deipnosophists* 3.115c–3.116a) quotes Galen when describing different varieties of wheat, cooking methods and nutritious and digestive properties of various qualities of bread.
[50] *CIL* IV 8561, area II. VII; Cooley & Cooley (2004: 164).
[51] *CIL* IV 4888; Cooley & Cooley (2004: 164).

Inscriptions on labelled pottery vessels from Pompeii likewise evince available foodstuffs. Barley (baked and salted), bay, chickpea, dried lees of wine, fennel, figs, honey, lentils, lupines, nuts, olives, pepper and prickly brine were found on the labels.[52] Most of the items, with the exception of pepper and prickly brine, correspond with the pollen and plant remains. Lupine seems to have been mainly used for animal fodder. The variety found in the pollen samples from Pompeii was the *Lupinus angustifolius* L. (blue lupin), which is used mainly as animal feed today. Galen mentioned that it was unpleasant, difficult to concoct and devoid of any health giving qualities.[53] This possibly explains why it was believed to be more appropriate for animal rather than human consumption. Dried lees of wine were remnants from wine production and might have had other uses such as textile dyes and medicines. Brine was used as a food preservative and as an essential ingredient in the fish sauces *garum* and *liquamen*. Both Pompeii and Herculaneum had a thriving production in these sauces, which were exported throughout the Mediterranean, as we can see by widespread amphora finds at other sites located around the sea.[54]

Although there is ample evidence for a range of available foods, this does not indicate that people regularly maintained a balanced diet. Only the human remains of bones and teeth can show if people habitually ate well or if they were generally undernourished by modern health criteria. The biological anthropologists, Bisel and Bisel carried out a biochemical analysis of human bones from the area for magnesium, calcium, phosphorous, zinc, strontium and lead. [55] The presence of zinc in bones signifies regular consumption of red meat, unleavened bread and unrefined cereal protein, whereas the ratio of calcium to strontium levels indicates a diet high in vegetables and seafood. The bones from the study sample had high ratios of calcium to strontium and lower levels of zinc. Thus, the biochemical bone analysis, which suggests high consumption of vegetables and seafood is consistent with the varieties of food remains from the site.

Unfortunately, the surviving teeth did not undergo stable isotope analysis, which is method of scientific investigation that can indicate the specific nature of an individual's diet. Nonetheless, the teeth in the sample were examined and found to

[52] *CIL* IV 2568, 5598b, 5721–2, 5728–9, 5730, 5731, 5745–60, 5761, 5763, 6048, 6580, 9420, 10288, 10292.
[53] Galen, *On the Properties of Foodstuffs* 1.24 (6.534-6 Kühn).
[54] See, for example, Marzano (2007); Desse-Berset & Desse (2000); Etienne & Mayet (1998). For *garum* production in Pompeii, see Banducci (this volume) and Wallace–Hadrill (1994: 135).
[55] Bisel & Bisel (2002: 457–8).

have had fewer caries[56] than expected, showing a diet lacking in sweets. They also had high fluorine levels, possibly because of the minerals in the drinking water.[57]

In combination, the archaeological evidence reveals that diets were, according to modern standards of nutrition, healthy. The diet and foods consisted of vegetables, seafood, grains, fruits and legumes. Essentially the Romans in the area appear to have eaten what is commonly referred to today as a "Mediterranean diet". Yet, since conceptions of health, diet and food properties in the ancient world were based on the humoral system and viewed quite differently from modern perceptions, we now return to the question raised in the introduction, how were foods found in the archaeological record understood by the Romans in terms of their health giving properties?

Food Flavours and Health

Seventy-seven foods were identified in the archaeological record, and Galen wrote about sixty-nine of them (Table 8.1). The foods Galen did not refer to were specific classifications of fish and shellfish, which might have been implied when he wrote generally about these foods. In most instances when he described foods, he mentioned their properties and powers. In thirty-one cases of foods found in the archaeological record, Galen described their flavours in relation to their properties and powers. His descriptions corresponded with what other writers said about food properties and flavours.

Although the focus of this chapter is on the Roman era, the medical ideas about food properties did not originate with them. Some of the Hippocratic texts, particularly those concerned with regimen, also described the importance of a healthy diet. The Hippocratic writer of *On Regimen* stated that the powers of foods were not easily distinguishable by their flavours:

> Those who have undertaken to treat in general either of sweet, or fat, or salt things, or about the power of any such thing, are mistaken. The same power does not belong to all sweet things, nor to all fat things,

[56] This is the standard anthropological term for cavities.
[57] Bisel & Bisel (2002: 455); Lazer (2009: 172).

> nor to all particulars of any other class. For many sweet things are laxative, many binding, many drying and many moistening.[58]

Other medical writers, by contrast, tended to follow some general rules about the relationship between food flavours and the elemental characteristics associated with the humours, as will be shown. However, for these thinkers as for Galen, once ingested, foods could not be transformed to a humour distinct from its own nature.[59] Nonetheless, before consumption, foods could change and develop different qualities caused by its age or cooking methods. This possibly explains why the writer of *On Regimen* believed that flavours could not be used to determine food powers. This writer pointed out the properties could change according to cooking methods. The process of boiling and cooling foods destroyed their strengths, this author suggests. Moreover, soaking and boiling salty foods removes their saltiness and mixing sweet things into bitter and sharp foods or mixing oils into astringent ones balances them.[60] The addition of ingredients to change food powers is seen in Apicius' recipe for Easily Digested Relish, and in a recipe for cultivated lettuce described by Galen. In this, Galen recommended adding something salty or bitter to lettuce to counteract its cold and moist constitution. These ingredients would also give it the power to stimulate excretion.[61]

Age could also change food properties. For example, unripe pears were astringent and binding, and ripe pears were sweet and nutritious.[62] When the properties of food changed, so did their flavour, indicating a direct relationship between the two. Although space does not allow for an in depth survey of all medical– and food –related literature from the time, a brief survey of Galen, Celsus, Athenaeus and Apicius shows that there was a common conception of food powers and their relationship to specific tastes that contradicts the opinion of the Hippocratic *On Regimen*.

In essence, Roman writers categorized food according to their abilities to give nutrition to the body and/or aid in digestion.[63] For example, Celsus divided foods into three classes: strong, middle and weak. The strongest was the most nutritious and the

[58] Hippocrates, *On Regimen* 2.39 (6.536 Littré).
[59] Galen, *On the Properties of Foodstuffs* 2.6 (6.568 Kühn).
[60] Hippocrates, *On Regimen* 2.56 (6.567–9 Littré).
[61] Galen, *On the Properties of Foodstuffs* 2.40 (6.624–8 Kühn).
[62] Galen, *On the Properties of Foodstuffs* 2.24 (6.603–4 Kühn).
[63] See Paulas and Totelin (this volume). Wilkins (2015).

weakest, the least nutritious. According to him, weak foods tended to be insipid in flavour and consistency.[64] He also said that the nutritional powers could be identified if the foods had good or bad juices, stating that the Greeks believed that foods were *euchylous* or *kakochylous*. *Euchylous* can be translated "well-flavoured or "juicy". In his translation of Celsus, Spencer takes this term to mean "digestible", which was indicated by sweet flavours. On the other hand, *kakochylous* meant "bad-flavored" or "bad juice", as Spencer suggests, "indigestible".[65] This latter category included everything acrid, which had flavours that were harsh, sour and salty. In spite of the quality of the juice, both flavours could have healthy or harmful qualities, depending on what the body required.[66] Furthermore, although all flavours are initially perceived in the mouth, their effects were not limited to the tongue, but were also key components of the digestive process that occurred in the abdomen.

Like Celsus, Galen stated that foodstuffs have an intrinsic pungency, astringency, acidity, bitterness, sweetness, saltiness or harshness.[67] While Mnestitheus of Athens, a physician who supposedly wrote a treatise on food, was quoted in Athenaeus as saying, "all salt and sweet juices move the bowels. But acid and pungent foods stimulate urine; bitter juices are more diuretic and some loosen bowels and astringent ones check excretion".[68] Here we see a common agreement between the writers about the general flavours that effect food classification.

Replacing lost nutriments was vital for good health. According to the Hippocratic writer of *On Regimen,* nutrition made its way to the parts of the body when foodstuff melted and spread warmth through it.[69] Galen concurred and argued that nutritious foods were heating, filling and sweet.[70] Sweet foods tended towards thickness. For example, he identified bone marrow, figs, grapes and raisins as sweet, nutritious foods. The fruits were readily available in the Italian peninsula, and it was likely that the marrow came from the bones of the types of animals identified in the archaeological record, such as cattle. Bone marrow, according the Galen, was sweeter, tastier and fattier than brain, and both were nutritious if well-concocted. However, it was advised that both be eaten in small amounts otherwise nausea would

[64] Celsus, *On Medicine – De medicinae* 2.18.1–11.
[65] Celsus, *On Medicine.* 2.19.1; Spencer (1971) note a.
[66] Celsus, *On Medicine* 2.20.1–33.6.
[67] Galen, *On the Properties of Foodstuffs* 1.1 (6.465 Kühn).
[68] Athenaeus, *Deipnosophists* 3.92b.
[69] Hippocrates, *On Regimen* 2.56.50–60 (6.569–70 Littré).
[70] Galen, *On the Properties of Foodstuffs* 2.62 (6.651 Kühn).

occur.[71] In the case of figs, Galen warns that they should not be taken with ingredients that would thicken them because this would do harm,[72] likely because as a sweet food they were naturally thickening and the additional ingredients would cause this property to be in excess. Figs, however, could be taken with bitter herbs and condiments, like salt and vinegar, to perform a thinning function that was particularly good for the liver and spleen.

The grape received ample attention in ancient literature, particularly for its use in the production of raisins and wine.[73] The flavours of both differed depending on the variety of grape from which they were made. Sweet wines and raisins had the potential for being warming and nutritious.[74] Galen advised that the thick, dark, sweet, red wines were best for the blood. They concocted more in the stomach and easily spread to parts of the body more than wines of other flavours, colours and consistencies. However, since it was thick, it was not beneficial for elimination through urination, which was best helped by thinner wines.[75]

Athenaeus reported the benefits of different types of wines including those that were sweet. He referenced Praxagoras, who said that the most nutritious wines were made from sweet white and yellow grapes. These smoothed the parts of the body through which they passed, and thickened the humours. They also tended to stay in the hypochondriac region,[76] which is located in the chest below the breast, so they did not cause headaches. Three other examples are found in Athenaeus that support this idea. First, he described a sweet Arousian wine from Chios as nourishing and laxative.[77] Second, he quoted Mnesitheus of Athens, who said that dark wine was most favorable for bodily growth.[78] Third, he noted that the properties of wine should be considered when determining when they should be imbibed. Before dinner, drinking *protropon*, a sweet Lesbian wine, or any diluted sweet warm wine was recommended because it was good for the stomach.[79] This was possibly advised because it relaxed the stomach and aided the digestive process by helping to spread warmth and nutrition. In spite of its healthful properties, sweet wines had to be taken

[71] Galen, *On the Properties of Foodstuffs* 3.7–8 (6.677 Kühn).
[72] Galen, *On the Properties of Foodstuffs* 2.8 (6.572–3 Kühn).
[73] See Boulay (this volume) on wine.
[74] Galen, *On the Properties of Foodstuffs* 2.10 (6.581–2 Kühn).
[75] Galen, *On the Properties of Foodstuffs* 3.39 (6.743–5 Kühn).
[76] Athenaeus, *Deipnosophists* 1.32d–e.
[77] Athenaeus, *Deipnosophists* 1.32f.
[78] Athenaeus, *Deipnosophists* 1.32d.
[79] Athenaeus, *Deipnosophists* 2.45e.

in moderation or they would become harmful. Moreover, eating and drinking foods with opposite properties in conjunction with sweet foods would maintain a balanced digestive system.

To counterbalance excessive nourishment, the other role of digestion was to cleanse the body by thinning or cutting the humours and removing waste through urination and excretion. Foods to assist in this process were heating and cutting with powers to melt and reduce thick humours in the body and stomach. The flavour descriptors sharp, bitter and salty, were regularly used in conjunction with these effects. Yet, each of these flavours had powers that cleansed the body slightly differently.

Recalling Apicius' recipe for good digestion mentioned in the introduction to this chapter, two flavours were beneficial for this process: sweet and salty. It has been shown that sweet flavours warmed and moved nutriments around the body as part of the digestive process, but salty foods helped to empty it. Interestingly the recipes that Apicius described in his section on good digestion contained many of the same ingredients. All but two of them called for beets.[80] The other two were for polypody, already described, and green celery. The celery recipe recommended that the vegetable was washed, dried in the sun and then boiled with the head and white part of a leek until the water reached a third of its original volume. The liquid was strained and added to a mixture of pounded pepper, *liquamen* and honey, then poured back over the celery and boiled. The liquid could be served with or without the celery.[81]

The beet recipes also recommended using some of the same ingredients. One suggested that the beets be wiped clean but not washed, then bundled together. Soda should be sprinkled in the middle of each bunch. They are then placed in water and cooked. The dish is flavoured with some of the cooking water, *passum* or *caroenum*,[82] cumin, pepper and a little oil. When it boiled, a mixture of ground cooked polypody, broken nuts and *liquamen* was tipped into it, then the entire dish was placed in a hot container and covered.[83] The third suggestion recommended by Apicius was for Varro's beets. In this recipe, the roots of black beets were wiped and cooked in

[80] Apicius 3.2.1.
[81] Apicius 3.2.4.
[82] *Caroenum* may have been a sweet wine (Grocock & Grainger 2006: 334–5).
[83] Apicius, 3.2.2.

mulsum[84] with a little salt and oil. If cooked in salted water with oil, the liquid could also be used as a drink.[85] The recurrent food and condiments mentioned in the recipes are beets, leeks, polypody, cumin, oil, pepper, vinegar, honey and *liquamen*, which are warming, salty, bitter and, in the case of *liquamen* and honey they are sweet. Honey, however, was an unusual food, as Totelin points out in this volume because it also had a bitter taste, which gave it a cutting power. Their powers were all deemed useful for cutting excess humours and aiding in purgation. It is notable that, with the exception of cumin and honey, all the foods were identified in the archaeological record, indicating that people were commenting upon the beneficial properties of local ingredients.

Beets and leeks, according to Galen, were beneficial for digestion and splenic conditions because of their detergent property that stimulated excretion.[86] He did not describe the flavor of beets, but classified them with leeks, onions and garlic. These had biting and cutting properties that aided in the thinning diet. Yet, in Apicius' recipes the flavours of beets were altered with ingredients that were salty, which contributed to their cleansing powers.

The cleansing effect of salt can also be seen in other dishes recommended for digestion in Apicius' cookbook. A salted fish recipe was suggested for a poor stomach. Its ingredients included cumin, half that of pepper, one peeled clove of garlic, *liquamen* and oil.[87] In the section on endive and lettuce, a recipe for improving lettuce was also recommended for helping with digestion.

> [L]ettuce (serve with) *oxyporium*, with vinegar, and a little *liquamen* for the digestion (*ad digestum*) and to ease wind (*et inflationem*) and to prevent the lettuce from doing harm (*et ne lactucae ledent*): 2 oz. cumin, 1 oz. ginger, 1 oz. green rue, 12 scrupples date flesh 1 oz. pepper; 9 oz. honey. Ethiopian, Syrian, or Libyan cumin after you have steeped it in vinegar. When it has dried, mix all the ingredients with

[84] *Mulsum* seems to be related to the adjective *mulseus*, which means "sweet as honey". It might also be related to honey water, known in Greek as hydromel, or it was wine with honey added to it. See Totelin (this volume) for more on honey in medical contexts and Hitch (this volume) and Gowers (this volume) for the metaphors of sweetness and honey.

[85] Apicius, 3.2.3.
[86] Galen, *On the Properties of Foodstuffs* 2.43 (6.630 Kühn).
[87] Apicius, 9.10.12.

the honey. When required mix ½ teaspoon with the vinegar and a little *liquamen* or take ½ teaspoon after dinner.[88]

The ingredients in both dishes have warming and cutting powers, which likely enhanced or changed the properties of the foods to which they were added. The lettuce recipe also specifies that a small amount could be taken following a meal, similar to the modern *digestif*. It likely aided the digestive process and prevented a feeling of fullness after the meal was complete.

In comparison to their description in cooking texts, salty flavours were described similarly for their warming effect that helped to move the bowels, in medical texts.[89] Celsus said that pepper and salt were heating,[90] and Athenaeus argued that the meat of cockles, mussels and the like were not easily digested because of their salty liquor. If eaten raw, their saltiness would move the bowels. When cooked, they lost most of their salt, but the meat would cause stomach rumbling because of a lack of moisture in the food.[91] Galen, too, said mollusks contained a salty juice that promoted gastric emptying. After removing the juice, the flesh of the animal would become caustic to the stomach.[92] He also advised putting salt or fish sauce on olives, cabbage, figs and celery to enhance or give them purgative qualities.[93] Even wines could be treated with salt to perform the same function, as Athenaeus suggests when one of his interlocutors recommends the addition of seawater to wines.[94] Although salt could move the bowels, digestion also assisted in cutting bodily humours.

If there was an excess of thick humours in the body, Galen recommended the thinning diet, which mainly consisted of foods that were heating, sharp and bitter.[95] As seen, Apicius recommended celery for its digestive properties, and Galen agreed, stating that its bitter quality was particularly useful as a diuretic.[96] Other bitter foods mentioned by Galen were garlic,[97] leek, pistachios and radish.[98] Juniper, which was

[88] Apicius, 3.18.2.
[89] See, for example, Celsus, *On Medicine* 2.29.2.
[90] Celsus, *On Medicine* 2.27.1.
[91] Athenaeus, *Deipnosophists* 3.37c–d.
[92] Galen, *On the Properties of Foodstuffs* 3.32 (6.733–5 Kühn).
[93] Galen, *On the Properties of Foodstuffs* 2.8 (6.572 Kühn), 2.27 (6.608–9 Kühn), 2.44 (6.631–3 Kühn), 2.51 (6.637 Kühn).
[94] Athenaeus, *Deipnosophists* 1.32d–e.
[95] Galen, *On the Thinning Diet* 9, 11; Cf. Rudolph (this volume) for similar views among Democritus, Plato and Epicurus.
[96] Galen, *On the Properties of Foodstuffs* 2.51 (6.637–9 Kühn).
[97] Galen, *On the Properties of Foodstuffs* 2.69 (6.658–9 Kühn).

sharp and heating, was recommended for cleansing the kidneys.[99] Cheese was considered sharp and would became more so if rennet was added to it. This would cause it to lose moisture, particularly when aged. This was harmful because it enhanced its fiery state and would cause excessive dryness in the body.[100] Thus, these foods also had to be taken in moderation otherwise a bad reaction would occur with the bodily mixture.

In some instances cooling and binding properties were necessary for aiding digestion, particularly for a weak stomach and loose bowels. In these cases astringent and sour foods were recommended. Sour and astringent fruits were not advised for thinning the humours because they were only of use for the fluids in the gut.[101] For example, Galen described sour pomegranates as beneficial for stomach ailments.[102] He did not explain why, but perhaps it was because they had cooling, binding powers that constrained the bowels. Other foods with astringent flavours were found in the Bay of Naples: apples help with evacuation;[103] blackberries cause constipation;[104] cherries, lentils, myrtle and quince strengthen the stomach,[105] and rose hips restrain it.[106] Astringent raisins had stronger qualities than the harsh ones.[107]

Foods with cooling and moistening properties were bland, watery, but could, nonetheless, do harm. Although they add moisture to parched bodies and act as a diuretic, eating too much of these foods could generate phlegm production. Foods of this sort such as apples, pears, cucumbers and some pomegranates were not supposed to be eaten raw. Galen advised that cooking them would make them less harmful, likely because cooking warmed and dried them.[108] Thus, we see that the foods found by archaeologists were categorized by their flavours and properties that were similar to, if not shared with, bodily humours.

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[98] Galen, *On the Properties of Foodstuffs* 2.30 (6.612 Kühn), 2.69 (6.658 Kühn).
[99] Galen, *On the Properties of Foodstuffs* 2.15 (6.590 Kühn).
[100] Galen, *On the Properties of Foodstuffs* 2.16 (6.696–7 Kühn).
[101] Galen, *On the Thinning Diet* 10.
[102] Galen, *On the Thinning Diet* 4; see Warren (this volume) for the transformative properties of pomegranates.
[103] Galen, *On the Properties of Foodstuffs* 2.22 (6.599 Kühn).
[104] Galen, *On the Properties of Foodstuffs* 2.13 (6.589 Kühn).
[105] Galen, *On the Properties of Foodstuffs* 2.21 (6.588–9 Kühn), 1.18 (6.525–8 Kühn), 2.18 (6.592 Kühn), 2.23 (6.602–3 Kühn).
[106] Galen, *On the Properties of Foodstuffs* 2.14 (6.589–90 Kühn).
[107] Galen, *On the Properties of Foodstuffs* 2.10 (6.581–2 Kühn).
[108] Galen, *On the Properties of Foodstuffs* 22.6 (6.567–9 Kühn), 2.22 (6.598–601 Kühn), 2.24 (6.604–5 Kühn); Galen, *On the Thinning Diet* 2.

Conclusion

We began questioning the extent to which Roman medical writers and authors of other literary genres described foods that could be identified in the archaeological record. As this chapter has shown, a variety of foods were found through different archaeological methods (explored in greater detail by MacKinnon and Livarda in the following chapters), and the Romans in the Bay of Naples regularly consumed a beneficial diet rich in vegetables, legumes and seafood with a lighter consumption of meat. Since a healthy state was better than being ill, the regimen advocated by Roman physicians in the first two centuries CE included easily obtainable foods rather than exotic ingredients. They medicalized the diet by suggesting that foods be eaten in a balanced manner, so that one type was not consumed in excess, creating a humoral imbalance in the body.

We have also explored in a Roman context a larger theme in this volume, namely, how food was classified in antiquity and what the perceived link between food flavours and their powers could be. In relation to ancient medicine and humoral balance, this survey of food descriptions demonstrates that the foods had properties shared with humours: warming, cooling, drying and moistening that were associated with various flavours. Two other statements made by Galen support the relationship between food flavours and properties. In one he advised that unpleasant food was bad for the digestion,[109] likely meaning that it did not add nutrients to the humours in the way sweet and thick foods did.[110] In another he was more specific when he said "[k]eep in mind that what applies to all foodstuffs, bitter sharp foods in a meal give less nutriment to the body; and the bland ones, and more than these sweet foods, give much nutriment; and still more so if they have a compacted substance so that they are neither moist nor porous in composition."[111] It seems that the idea of a balanced diet, in the ancient humoral sense, was followed, given that the bones and teeth from the Bay of Naples indicate the foods recommended by the physicians were regularly consumed. Moreover, food writers spoke of the relationship between food powers and

[109] Galen, *On the Properties of Foodstuffs* 2.51 (6.637–9 Kühn).
[110] Galen, *On Hygiene* 1.13–14 (6.68–72 Kühn), 4.3 (6.241–2 Kühn).
[111] Galen, *On the Properties of Foodstuffs* 2.62 (6.651 Kühn).

flavours and demonstrated how to change or enhance a food's value.[112] Keeping in mind that foods did not come with labels advising nutritional content, the Romans relied on their sense of taste to determine the importance of food in their diet.

[112] Indeed, such characteristics are also a key component of ancient drink, as Boulay explores in chapter eleven.

Table 8.1
Comparison of Bay of Naples Food Remains with Apicius and Galen's *On the Properties of Foodstuffs* (*OPF*) & *On the Thinning Diet* (*OTD*)[113]

	Food (Botanical name)	Inscription Number	Pollen, Seed or Pip	Food Remain	Bone/shell	Coprolite	Residue Remain	Pot Label	Flavour	Ancient Source
1	Alfalfa (*Medicago sativa* L.)		x							
2	Almond, Sweet (*Prunus dolchis* [Miller] D. A. Webb)		x	x					Sweet	*OPF* 2.29 (6.611–2 Kühn) *OTD* 10*
3	Animal Bones (unspecified)				x					
4	Apple (*Malus domestica* Borkh.)		x	x					Harsh, astringent, bland	*OPF* 2.21–2 (6.599 Kühn)* *OTD* 2*, 10
5	Barley (*Hordeum vulgare* L.)		x					*CIL* IV 5745–60		*OPF* 1.10–2 (6.504–10 Kühn) *OTD* 6
6	Bay (*Laurus nobilis* L.)		x					*CIL* IV 6048		
7	Beetroot (*Beta vulgaris*)	*CIL* IV 4888								*OPF* 2.43 (6.630 Kühn) *OTD* 2, 8
8	Blackberry, wild (*Rubus ulmifolcus* Schott)		x						Astringent	*OPF* 2.13 (6.589 Kühn)* *OTD* 3, 10
9	Black-eyed Pea (*Vigna unguiculata* L. Walspers)		x							See peas and fava beans
10	Bread	*CIL* IV 4888; 5380; 8561		x						See wheat and barley
11	Broad/fava beans (*Vicia faba* L. & *Vicia faba* var. *minor*)		x	x						*OPF* 1.19 (6.592–632 Kühn)
12	Cabbage (*Brassica rapa* L.)	*CIL* IV 4888	x						Salty with fish sauce and salt	*OPF* 2. 44* (6.631–3 Kühn) *OTD* 2
13	Carob (*Ceratonia siliqua* L.)		x							*OPF* 2.33 (6.615 Kühn)
14	Carpetshell clam (*Venerupis decussate* L.)				x					
15	Celery (*Apium graveolens* L.)		x						Bitter	*OPF* 2.51* (6.637–9 Kühn); *OTD* 2
16	Cheese	*CIL* IV 5380; *CIL* IV 8561								*OTD* 11
17	Cherry, tart (*Prunus cerasus* L.)		x	x					Astringent	*OPF* 2.12 (6.588–9 Kühn)* *OTD* 10
18	Chestnut, sweet (*Castanea sativa* Miller)		x	x						*OTD* 10
19	Chickpea (*Cicer arentinum* L.)		x					*CIL* IV 5728-9		*OPF* 1.22 (6.533–4 Kühn)
20	Cucumber (*Cucunis* sp.)		x						Bland/watery	*OPF* 2.6 (6.567–9 Kühn)* *OTD* 2*
21	Date (*Phoenix dactylifera* L.)			x						
22	Domestic cow (*Bos Taurus* L.)				x				Cheese: sharp Milk cheese: sour Bone marrow:	Cheese: *OPF* 3.14–16 (6.681–99 Kühn)* Meat: *OPF* 3.1 (6.661–2 Kühn)

[113] * Signals that author refers to food flavour in relation to health, digestion or humoral quality.

									sweet	Marrow *OPF* 3.8 (6.677 Kühn)*
23	Donax clam (*Donax trunculus* L.)				x				Salty	*OPF* 3.32 (6.733–5 Kühn)*
24	Eggs (shell remains)				x					*OPF* 3.21 (6.705–7 Kühn)
25	Fennel (*Foeniculum vulgare*							*CIL* IV 5731		*OTD* 3
26	Fenugreek (*Trigonella corniculata* [L.] L.)		x							*OPF* 1.24 (6.537–8 Kühn)
27	Fig (*Ficus carica*)		x	x				*CIL* IV 2568	Sweet	*OPF* 2.8 (6.572 Kühn)* *OTD* 10
28	Flax (*Linum usitatissimum* L.)		x							*OPF* 1.32 (6.549 Kühn)
29	Garlic (*Allium sativum* L.)		x					*CIL* IV 2070	Bitter, sharp	*OPF* 2 .69 (6.658–9 Kühn)* *OTD* 2, 3, 9*
30	*Garum*						x		Salty	*OTD* 3
31	Grape, common (*Vitus vinifera* L.)		x	x					Sweet, sour, harsh	*OPF* 2.9–10 (6.578–9 Kühn)* *OTD* 10, 11*
32	Goat (*Capra hirca* L.)				x					Milk/cheese: *OPF* 3.14–16 (6.681–9 Kühn) Meat: *OPF* 3.1 (6.666 Kühn)
33	Hazel (*Corylus avellana* L.)		x							*OTD* 10
34	Honey								Sweet, slightly bitter	*OTD* 3, 11*
35	Juniper (*Juniperus* sp.)		x						Bitter	*OPF* 2.15 (6.590 Kühn)*
36	Leek (*Allium ampeloprasum*)	*CIL* IV 5380	X						Bitter	*OPF* 2.69 (6.658–9 Kühn)*; *OTD* 2, 8
37	Lemon (*Citrus limon* [L.] Burm. F.		x	x						*OTD* 10
38	Lentil (*Lens culinaris* Medicus)		x					*CIL* IV 6580	Astringent	*OPF* 1.18 (6.525–8 Kühn)*
39	Lupine (*Lupinus* sp.)							*CIL* IV 9420	Bitter,	*OPF* 1.23 (6.534–6 Kühn)*
40	Millett, foxtail (*Sertaria italic* (L.) Beauv.		x							*OPF* 1.15 (6.523–4 Kühn)
41	Mint (*Mentha* sp.)	*CIL* IV 4888								*OTD* 2
42	Mulberry (*Morus* L.)		x			x				*OPF* 2.11 (6.584–8 Kühn) *OTD* 2
43	Mustard (*Sinapis* sp.)	*CIL* IV 4888	x						Sharp	*OTD* 2, 6, 11*
44	Myrtle (*Myrtus communis*)		x						Astringent	*OPF* 2.18 (6.592 Kühn)* *OTD* 10
45	Nettle, non-stinging (*Parietaria officinalis* L.)		x							*OPF* 2.53 (6.639 Kühn) *OTD* 3; 10
46	Nettle, stinging (*Uritica dioica* L.)		x							*OPF* 2.53 (6.639 Kühn) *OTD* 3, 10
47	Olive (*Olea europa* L.)	(Oil and Olives) *CIL* IV 5380	x	x				*CIL* IV 5598b; 10292	Astringent	*OPF* 2.27 (6.608–9 Kühn)*
48	Onion (*Allium coepa* L.)	*CIL* IV 5380; 8561	x						Sharp	*OPF* 2.69 (6.658–9 Kühn)* *OTD* 2, 3, 9*
49	Pea (*Pistum sativum*L.)		x							*OPF* 1.21 (6.532 Kühn)
50	Peach (*Prunus persica* [L.] Batsch.		x							*OPF* 2.19 (6.592–3 Kühn) *OTD* 10
51	Pear (*Pyrus communis* L.)		x						Harsh	*OPF* 2.22 (6.598–601 Kühn)*; 2.24 (6.603–5 Kühn)* *OTD* 2*, 10*

52	Pepper (*Piper nigrum*)							*CIL* IV 5763		*OTD* 6, 8
53	Peppercress (*Lepidium* sp.)		x							*OPF* 2.54 (6.640 Kühn)(cress) *OTD* 2
54	Pilgrim's Scallop (*Pecten jacobaeus* [L.]				x					
55	Pistachio (*Pistacia* sp.)		x						Bitter, astringent	*OPF* 2.30 (6.612 Kühn)* *OTD* 10
56	Polypody (*Polypodium* sp.)		x							Apicius 3.2.1
57	Pomegranate (*Pinica grantum* L.)		x						Sweet, watery, sour	*OPF* 2.24 (6.604–5 Kühn)* *OTD* 10*
58	Poppy (*Papaver rhoeas* L.)		x							*OPF* 1.31 (6.548 Kühn)
59	Purslane, common (*Portulaca oleracea* L.)		x							*OPF* 2.46 (6.634 Kühn)
60	Quince (*Cydonia oblonga* Miller)		x						Astringent	*OPF* 2.23 (6.602–3 Kühn)*
61	Rabbit (*Oryctolagus cuniculus* L.)				x					*OPF* 3.1 (6.666 Kühn)
62	Radish (*Raphanus* sp.)		x							*OPF* 2.68 (6.656–8 Kühn)
63	Radish, wild (*Raphanus raphanistrum* L.)		x							*OPF* 2.68 (6.656–8 Kühn)
64	Rocket (*Eruca* sp.)		x							*OPF* 1.30 (6.639 Kühn); 2.52 (6.547–8 Kühn) *OTD* 2
65	Rose, French (*Rosa gallica* L.)		x						Astringent	*OPF* 2.14 (6.589–90 Kühn)* (dry roses)
66	Sea urchin (*Paracentrotus lividus* [Lamarck])			x	x					*OPF* 3.37 (6.738 Kühn)
67	Salt	*CIL* IV 4888								*OTD* 3, 6
68	Sheep (*Ovis aries* L.)				x					Milk *OPF* 3.14 (6.681–99 Kühn)
69	Sheep's sorrel (*Rumex acetosella* L.)		x							*OPF* 2.47 (6.634–5 Kühn)
70	Walnut (*Juglans regia* L.)		x	x					Astringent	*OPF* 2.28 (6.609–11 Kühn)* *OTD* 10
71	Wheat, common (*Triticum aestivum* L.)		x							*OPF* 1.2 (6.480–90 Kühn) *OTD* 6
72	Wheat, durum (*Triticum durum* L.)		x							
73	Wheat, Einkorn (*Triticum monococcum* L.)		x							*OPF* 1.13 (6.511–22 Kühn)
74	Wheat, Emmer (*Triticum duoccum* Schrank)		x							*OPF* 1.13 (6.511–22 Kühn)
75	Wild boar or pig (*Sus scrofa* L.)				x					*OPF* 3.1–3 (6.660–8 Kühn), 3.5 (6.669–77 Kühn)
76	Wine (too various, see also grape)	*CIL* IV 5380, 8561					x		Sweet, harsh, astringent	*OPF* 3.39 (6.743–5 Kühn) *OTD* 6, 11*
77	Vinegar								Sharp	*OTD* 3, 11* (see also Grape)