Introduction

Pestilential diseases were a major concern in Renaissance medicine.\(^1\) This period saw regular outbreaks of plague after the fourteenth-century Black Death, as well as unknown deadly fevers and “new” contagious diseases brought from the New World. In facing the epidemic and fatal character of this type of disease, physicians struggled not only to find an efficient therapy, but also to provide a consistent explanation of its origin and nature. To do so, they relied on the abundant literature on plague and pestilence that had flourished from Antiquity, following the medical authority of Hippocrates and Galen.

From the Galenic literature on plague, the idea spread that violent and often contagious affections, such as plague, syphilis and poisoning, required a different cure than the traditional humoral therapy. Rather than considering violent diseases as a disorder of the four qualities, physicians tended to attribute them to a different cause related to the stars, hence suggesting an alternate etiology and treatment. In the Renaissance, Platonic physicians did so by following the philosophy of Marsilio Ficino. The chief representative of the Platonic medical movement was the French physician Jean Fernel (c.1497–1558), professor of medicine at Paris and court physician of Henri II.\(^2\) In his works on Galenic medicine, Fernel asserted that the living body had a divine part related to its soul.

\(^1\) On plague in medieval and early modern medicine, see Arrizabalaga 1994; Carmichael 2008; Nutton 2008; Stevens Crawshaw 2016.

\(^2\) On the life and works of Jean Fernel, see Henry 2017; Kany & Turpin 2002; Sherrington 1946.
This vital principle was a source of celestial heat which vivified the organism, and made its physiological functions work. In contrast, the material part of the living body was made of the four elements with which were associated the four qualities and four humors. Whenever adopted or criticized, Fernel’s Platonic conception of the living body played a prominent role in early modern medical debates.³ His works had a lasting influence on early modern physicians with various philosophical inclinations, including Aristotelian, Paracelsian and Cartesian interpretations.

Whereas Fernel’s Platonic views on medicine seemed theoretical in nature, they had a practical counterpart regarding the cure of sickness. Not only did Fernel state that the living body had a vital principle which was different in nature from its material constitution, he also suggested an alternative therapy to humoral medicine. In his view, violent and pestilential sicknesses, which affected the body’s vital principle, required a treatment based on specific active powers, medicinal ingredients and modes of preparation.⁴ This reasoning relied on a set of “occult”, that is hidden, causes regarding the origin and cure of pestilence, and its physiological response within the body.

The nature of Fernel’s treatment of plague and pestilence is the focus of this chapter. Fernel explored this theme in his theoretical and practical account of “occult” diseases throughout his works. His approach to these diseases in De abditis rerum causis [On the Hidden Causes of Things] (1548) was above all a philosophical treatment of the concept.⁵ Centered on the notion of “occult” causation, his interpretation has been explored by historians of science from the angle of the Platonic philosophy of Ficino. However, it also suggested some therapeutic application, which was further explained in his didactic works included in the Universa Medicina (1567). Fernel, indeed, discussed “occult” diseases in his Pathologia [Pathology], while proposing a dedicated therapy in his Therapeutices [Therapeutics].⁶ These treatises stood as a bridge between his

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³ On the reception of Fernel in early modern medical philosophy, see Hirai 2011; Deer Richardson 2018; Hirai 2005; Calan 2012.
⁴ Deer Richardson 1985; Forrester & Henry 2005.
⁵ Fernel 2005. On this treatise, see Hirai 2011, pp. 46-80; Deer Richardson 1985; Forrester & Henry 2005.
⁶ Fernel’s Pathologia and Therapeutices are included in Fernel 1567, pp. 176-343 and 344-557, respectively.
philosophical reasoning in *De abditis rerum causis* and his practical *Consilia*, a collection of therapeutic advice which were posthumously published.\(^7\)

This investigation will be focused on Fernel’s explanation of “pestilential diseases” as a category of epidemic and often fatal diseases, whose outbreak, causes and treatment were challenging to explain in his time. With this in mind, I will trace Fernel’s interpretative path from his cosmological explanation of plague and pestilence to his explanation of drug action and its practical impact on therapy. To do so, I will delineate the ancient, medieval and Renaissance medical approaches to these questions, which Fernel synthetized in developing his own pathology, pharmacology and therapeutics of pestilential diseases. In the final section, I will appraise to what extent Fernel’s explanation of “occult” causes shaped his therapy of plague. What type of treatment, ingredient and preparation did Fernel recommend for the cure of pestilential diseases? What was the role of practical tools and knowledge, such as alchemy, in these medicinal preparations? Before tackling these questions, I shall now address Fernel’s account of pestilence within the category of “occult” diseases.

**“Occult” Pathology: The Case of Pestilential Diseases**

Since the Antiquity, physicians had attempted to explain the nature and causes of epidemic diseases as part of the category of plague and “pestilence.”\(^8\) The Hippocratic treatise *On the Nature of Man* attributed their causes to the corruption of air through some polluted “exhalations”, i.e., miasma. Galen, mostly in his treatise *On the Different Types of Fever*, shaped the Hippocratic idea of corrupted air into a theory of pestilential “seeds” in the air, which contaminated people through respiration. He added that the cause of contamination was related to lifestyle, including diet and other parameters, which would be listed in the medieval literature on the “six non–naturals.” As the plague took the form of a pandemic in the late Middle Ages, with regular outbreaks between the four-

\(^7\) Fernel 1585.

\(^8\) On medical theories of plague and contagion from Antiquity to the Renaissance, see Pennuto 2020; Nutton 1983; Weill & Parot 2004.
teenth–century “Black Death” and the eighteenth century, physicians maintained the Galenic explanation and ascribed the corruption of air to some astral causation.⁹ For instance, a remarkable astrological aspect, such as a conjunction between Mars, Jupiter and Saturn, could bring about the corruption of air that was believed to induce plague and pestilence.

Such a Galenic account of pestilence was the framework that Fernel used in his own explanation of “pestilential diseases” in *De abditis rerum causis.*¹⁰ He further refined it in his *Pathologia,* which was first published in *Medicina* (1554) as a didactic and systematic work on physiology, pathology and therapeutics. In the following sections, I consider Fernel’s amalgamation of ancient and medieval explanations of pestilence, from astral causation to modes of transmission and infection, in order to frame his philosophical explanation of pestilential diseases within the broader category of “occult” diseases.

**The Disposition of the Stars**

Fernel’s account of “pestilential diseases” (*pestilentes morbi*) included violent diseases such as bubonic plague and other varieties of fatal “pestilential fevers”. It also comprised minor affections, mostly childhood diseases resembling measles (*exanthema*) and chickenpox (*ecthyma*). In the same way as bubonic plague, these affections were considered as diffused through the air and accompanied by a rash, in particular, blotches and blisters.¹¹ However, they were harmless to children and rapidly dissipated.¹² Outside of the easily recognizable plague and childhood diseases, other types of “pestilential fevers” could pass unnoticed with mild

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⁹ On astrological explanation of plague in scholastic medicine, see WEILL–PAROT 2004.

¹⁰ On Fernel’s pathology of the total substance in *De abditis rerum causis,* see DEER RICHARDSON 1985; FORRESTER & HENRY 2005.


¹² FERNEL 1567, p. 258: “Utriusque sua propriaque causa in aere: qualitas quippe maligna diversi mitiorisque generis quam quae carbunculum bubonemque pestilentem ingenerat: proinde in infantes ac pueros, non autem in seniores, nisi ferocior immaniorque sit, invadit”.

symptoms, such as thin and rapid pulse, indigestion, insomnia and fatigue, which were followed by a quick and unexpected death.\textsuperscript{13} Pestilential fevers were more easily detectable when accompanied by a secondary infection. In any case, they did not affect every individual but only those with a certain constitution that was, however, impossible for physicians to determine.

To explain the sudden outbreak of pestilential diseases, Fernel tacitly followed the scholastic accounts of plague in ascribing pestilence to the infection of ambient air by some astral influence.\textsuperscript{14} In this regard, he insisted that meteorological and insalubrious factors, which had been defined as “lower” celestial factors since Avicenna, were only aggravating circumstances. They did not help to prognosticate pestilence, which was produced by the only disposition of the stars.\textsuperscript{15} Such an astral influence explained the violent and fatal dimension of pestilence and, most importantly, its unpredictability and mutability over time. Fernel indeed noted that some plagues of the past, which were reported in the medical literature, had vanished, while unprecedented diseases appeared in his own time. Future generations, Fernel concluded, would observe more of them in time to come.\textsuperscript{16}

In the medical tradition, the mention of astral influence was not limited to the explanation of plague as it was part of a broader approach to physiology, pathology and therapeutics. Since Hippocrates and Galen, the configuration of planets and stars, for instance, the phases of the Moon, was consulted to prognosticate the paroxysm or “crisis” of cyclic diseases, most notably, the “critical days” of fever.\textsuperscript{17} As a typical Renaissance physician, Fernel was familiar with the use of astrology for medical

\textsuperscript{13} IVI, p. 25; FERNEL 2005, pp. 574-577.
\textsuperscript{14} FERNEL 1567, p. 181: “\ldots ex aere coelestium corporum viribus inquinato suscitantur, ut febris pestilens, et pestilens bubo [\ldots]”.
\textsuperscript{15} IVI, p. 257: “Ex his igitur praesagiri potest annum gravem calamitosumque fore, in quo putridi malignique morbi grassentur. At vere pestilentem annum fore, non hinc praevidere licet, sed ex sola syderum commistione, quae illius est procreatrix”. See also FERNEL 2005, pp. 548-549, 572-573.
\textsuperscript{16} FERNEL 1567, p. 181: “\ldots] alios vero alia secula protulerunt, qui veterum oblivione obruti extinctive iam sunt, alios futuris seculis posteritas animadvertet, quum novae syderum concursiones permistionesque illorum effectrices obtingent”. See also FERNEL 2005, pp. 568-569.
\textsuperscript{17} On Fernel’s account of celestial influence in \textit{De abditis rerum causis}, see HENRY 2013; SAIF 2011; HIRAI 2011, pp. 46-80.
purposes, to which he applied his extensive knowledge of mathematics.\textsuperscript{18} In his early work on astronomy, the \textit{Monalosphaerium} (1526), he discussed the critical days of fever according to Hippocrates, Ptolemy, Galen and the Spanish scholar Abraham ibn Ezra (ca. 1092–1167).\textsuperscript{19} Fernel also proposed different ways to calculate individual “horoscopes”, i.e., birth charts, in reference to the German astronomer Regiomontanus (1436–1476). From this, we can infer that Fernel likely used horoscopes to refine the diagnosis of his patients’ native constitution, and forecast the evolution of their sickness through astrological prognostication.\textsuperscript{20} Moreover, in the context of his discussion on pestilential diseases, Fernel identified the cause of the epidemic to a specific “disposition” of the stars. Along the lines of scholastic physicians like Pietro d’Abano (1250–1316), he thought that the stars could interfere with living beings by their light and movement into the air in such a way to influence longevity and health.\textsuperscript{21}

However, Fernel neither provided details on how the stars infected the ambient air, nor gave an example of an astral configuration heralding pestilence. In his view, the astral influence on the living was a type of knowledge nourished by secrecy and wisdom.\textsuperscript{22} Although it did not allow physicians to anticipate pestilence, it could help them to explain its cause and to give a suitable treatment after the outbreak. Fernel buttressed this explanation with the authority of Hippocrates and Galen. Both ancient physicians, he recalled, attributed a “higher” celestial origin to the infected miasmas that transmitted plague. Such a “hidden” and invisible provenance was imperceptible to the senses.\textsuperscript{23} In addition, Hippocrates and Galen more broadly stated that the stars were the cause of the “critical days” of diseases, for instance, through planetary aspects of

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\textsuperscript{18} On Fernel’s early training in mathematics, see \textsc{Henry} 2011.
\textsuperscript{19} \textsc{Fernel} 1526, ff. 10r–13r, 21r–23r.
\textsuperscript{20} See Fernel’s astrological insight into premature birth: \textsc{Fernel} 1585, pp. 118-119; \textsc{Sherrington} 1946, pp. 37-38.
\textsuperscript{21} \textsc{Fernel} 2005, p. 572: “Gravis est eorum stupiditas qui sidera nihil in aera nisi calorem aut frigus, imbres aut siccitatem lumine motuque suo inducere contendunt. Si illa bene constituia omnium vitam tuentur ac conservant, cur male constituia vitae non incommodent? Illinc prima et praecipua est rerum omnium salus et conservatio, illinc quoque interitus”.
\textsuperscript{22} \textsc{Fernel} 2005, p. 572: “O vere foelices qui secretiore hac cognitione sapientissimi fiunt: qua neque ad praecavendos, neque ad persanandos pestilentes morbos estulla praestantior”.
\textsuperscript{23} \textit{Ivi}, pp. 544-545.
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the Sun, solstice, equinox, and the rising of major stars and constellations. For Fernel, this confirmed that the stars were the hidden power which disseminated the toxic miasma responsible for pestilential diseases. The latter propagated due to a particular type of contagion through malignant “seeds” within the ambient air.

**Poisonous Seeds and Vapors**

In Fernel’s intention, the term “pestilential” (*pestilens*) seemed to take the broad sense of a fatal epidemic disease. However, other affections of this kind which were rife in the Renaissance, such as syphilis and leprosy, fell into the separate category of “contagious diseases” (*contagiosi morbi*) to the extent that they spread by the touching of skin – *contagio* meaning “contact” in Latin. Fernel’s category of “pestilence” thus suggested some invisible and intangible form of contagiousness, which was mediated by the ambient air. For him, there was no doubt that the very substance of air could be the substrate of violent diseases. If polluted by some astral configuration, the “seeds” (*semina*) of air could penetrate the body during respiration as well as perspiration, i.e., through the skin pores. These “seeds of pestilence” (*pestilentiae semina*) then contaminated the body by internal contact (*contagio*).

With his theory of plague seeds, Fernel synthetized the previous explanations that were provided in the Antiquity. Not only Galen suggested the existence of seeds in his medical approach to plague and pestilence, Lucretius, in his poem *On the Nature of Things* (e.p. 1473), founded his atomistic philosophy on the notion of seeds. As discrete components of nature, they were involved in the generation and corruption of all things, including the propagation of diseases. In Fernel’s time,

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24 FERNEL 1567, p. 257: “Pestilentis autem febris causa est pernicies venenataque qualitas e sublimi coelitusque in aerem demissa, quae quasi furibunda passim involat in vulgus. Quia enim pestilentiae semina aeri inspersa inspiratione perspirationeque intro subeunt, si cor affectioni praeparatum est, id continuo, inde vero arteriarum spiritus, postremo humores corpusque universum labefactant”.


26 NUTTON 1983.
the Italian physician Girolamo Fracastoro published an elegant poem on syphilis in the fashion of Lucretius, *Syphilis sive Morbus Gallicus [Syphilis or the French Disease]* (1530). The poem reported the contagion of the venereal disease through airborne seeds as particles which aggregated into “seedbeds” (*seminaria*) and propagated inside and between bodies. Unlike Lucretius, Fracastoro reframed this reasoning in a Galenic framework by substituting the traditional interpretation of “occult” sympathy to the atomistic notion of vacuum in order to explain the contact between seeds. Moreover, as Hiro Hirai has shown, Ficino was another major source for the medical theories of morbid seeds in the Renaissance. The Platonic cosmology that was presented in Ficino’s *De vita coelitus comparanda* (1489) explored the notions of form, seed and seedbeds as emanations of the world-soul, which were fundamental in Fernel’s *De abditis rerum causis*. In this sense, Fernel merged the Galenic, Lucretian and Ficinian interpretations of seeds for his own account of pestilential contagion through airborne minute entities originating from the heavens.

According to Fernel, the contamination by the pestilential seeds in the air was comparable to the ingestion of poison through breathing. By way of the infected seeds in the air, this pestilential poison, in the form of a malignant “vapor” (*vapor*), diffused through the lungs into the heart, the arteries and the whole body. It progressively infected the heart, the physiological “spirits” (*spiritus*) and the humors by putrefying them, before eventually corrupting the body’s substance. By “putrefaction”, Fernel meant a progressive decomposition of the body’s temperament due to the fading of its heat. As the body heat got weaker, humors immoderately increased and putrefied, with a fetid smell, and eventually dried up. The final phase of corruption designated the immediate destruction of the body’s substance.

Concurrently with the notion of morbid seeds, the theory of plague as a form of poisoning was widely diffused in Renaissance medicine. As

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27 On Fracastoro’s Lucretian theory of contagion, see Nutton 1990; Beretta 2003; Maurette 2014.
28 On the reception of Ficino’s theory of seeds in Renaissance medical philosophy, see Hirai 2006; Hirai 2005.
31 On medieval and Renaissance medical theories of poison, see Chandelier 2009; Gibbs 2018.
Joel Chandelier has pointed out, the Italian physician Christophoro degli Onesti (c.1320–1392) was one of the earliest figures to merge, in his treatise *De venenis* [On Poisons], the notions of plague, poison, substantial form and astral causation by synthetizing ancient and medieval authorities on these questions. The main source was Galen for his approach to the “total substance” (*tota substantia*) of bodies as the cause of properties that were remarkable yet unexplainable from the perspective of humoral medicine. For Galen, pharmacological substances such as purgatives, poisons and antidotes had a similar mode of action based on some magnetic attraction or “sympathy” from their total substance, which was known only by experience. Avicenna integrated this reasoning into the Aristotelian theory of matter–form by highlighting the relationship between the “total substance” and the “specific” form of bodies to explain their particular powers in a pharmacological context.\(^{32}\) Following both medical authorities, Pietro d’Abano ascribed a celestial provenance to the specific form, in particular, that of poisons, in support of his astrological view on medicine.

In his turn, Fernel assimilated the Galenic and Avicennian doctrines in a broader medical work that included, on top of the physiological and pharmacological powers of the total substance, the action of pestilence as a form of poisoning originating from the stars. He presented this view in a cosmological framework which was more in line with his time, by following the Platonic philosophy of Ficino in order to frame his interpretation of “occult” medicine.

### Total Substance and Innate Heat

As Fernel noted the rapid propagation of pestilential fevers, he acknowledged the difficulty of explaining what made them so prompt to infect the body. In his view, this was due to the “occult” nature of pestilence.\(^{33}\) This type of affection was included, along with contagious (*contagiosi*) and poisonous (*venenosi*) diseases, in the broader category

\(^{32}\) Weill & Parot 2004; Chandelier 2009; Gibbs 2018; Copenhaver 1984.

of “occult” diseases. Unlike ordinary illnesses, they were not related to some humoral imbalance, but affected the body’s total substance related to its substantial form. The terms “occult” and “hidden” emphasized that such a phenomenon related to the total substance went beyond the reach of reason and the senses, and could only be known by experience.

In Fernel’s medical philosophy, the total substance of a living body was in close connection with its vital principle, the “innate heat” (calidum innatum). Throughout his works, Fernel insisted on the divine and celestial origin of innate heat, which was transmitted to all living beings at birth. This explanation was anchored in his Platonic cosmology, which was expounded in De abditis rerum causis. In his view, God created living beings from the elements and infused them with celestial properties, which were transmitted through their seed. It was from this very seed, which contained a celestial “spirit” (spiritus) and heat of divine origin, that the “occult” properties of beings originated. It was also through this seminal principle that living beings acquired their substantial form. The latter came from a heavenly instantiation, which Fernel compared to Ficino’s world-soul (anima mundi), Avicenna’s giver of forms and Aristotle’s nature. From a physiological point of view, the “innate heat” of the living body was an instrument of the soul to make all the physiological functions work. These functions operated through the three main faculties of the soul – vegetative, sensitive and rational – which had their corresponding natural, vital and animal “spirits” related to the liver, the heart and the brain, respectively.

Defined as a vital principle related to the body’s substance, the innate heat was the target of “occult” diseases of the “total substance”, including pestilence. For this very reason, pestilential diseases acted differently from common illnesses, which were caused by a humoral disorder. In attacking innate heat, they first harmed the heart and the vital spirit. Then, they were particularly fatal in corrupting and destroying the vital principle of the patient, and ultimately, its substantial form. Nonetheless, the physician could count on an equally “occult” pharmacy to coun-

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The poisonous effects of pestilence. The active powers of these drugs were expounded in Fernel’s *Therapeutices*.

The Pharmacology of the Total Substance

Fernel’s pharmacological approach to “occult” diseases, including plague and pestilence, was rooted in the longstanding explanation of drug powers established by Galen. In his pharmacological works, Galen defined the properties of drugs according to three “faculties”. The first faculty was related to the remedy’s “temperament”, that is its primary qualities (hot, cold, dry and moist). The second faculty was associated with its “matter”, i.e., its secondary qualities related to its material texture, for instance, thick or thin, liquid or solid. The third faculty depended on the drug’s “total substance” related to its substantial form.

The tripartite order of faculties shaped the classification of drug powers and corresponding type of disease. Common diseases were considered as caused by an imbalance of temperament or matter. Less frequent forms of affections, which were violent, fatal and at times contagious, were allegedly caused by a corruption of the total substance. In any case, the treatment consisted in a “cure by contraries”, by administering a remedy which was opposite in primary or secondary qualities, or in substance. Following this Galenic framework, medieval Arabic physicians, such as Rhazes and Avicenna, brought important pharmacological contributions. They discussed the dosage of drugs, the quantification of their powers by degrees, and the relationship between the total substance and the Aristotelian concept of substantial form.

The Galenic and Avicennian accounts of drug powers were further transmitted in the West by late medieval and Renaissance physicians, from Pietro d’Abano to Leonhart Fuchs.

Fernel provided a synthesis of Galenic therapy and pharmacology in his *Therapeutices universalis seu Medendi rationis libri septem* [*Universal Therapeutics or The Seven Books of Method of Treatment*] (1567).

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37 On Galenic pharmacology, see BLANK 2018; AUSÉCACHE 2006; DEBRU 1997.
38 On the Latin-Arabic theory of drug powers, see MCVUGH 2009.
39 The three first books of the *Therapeutices* were first published in Fernel’s *Medicina* (1554). The complete version including seven books was posthumously published in the *Universa Medicina* (1567).
though he mostly cited ancient authorities to prove his point, the form and content of the treatise were based on Avicenna’s *Canon*.\(^{40}\) Fernel’s *Therapeutices* expounded on the range of cures that were used in early medicine according to the Galenic tradition: bloodletting, internal or external purgation, and medication. In the following sections, I examine Fernel’s pharmacological account regarding the treatment of pestilential diseases by covering the drug powers associated to the total substance, the types of “occult” drugs and their efficacy during therapy.

**Occult Properties and Sympathy**

Fernel continued the medieval and Renaissance discussion on the powers of drugs in relation to their qualities and substantial form, following the Aristotelian physics of matter–form. As he explained, drugs transformed the body’s natural constitution thanks to their qualities, which were present in “potentiality”. This Aristotelian term indicated that drug powers were not operative yet but needed to be activated by the body heat.\(^{41}\) At that moment, they were able to expand their own temperament and to act by contact (*contagio*) with the body part. Through some internal “mixture”, the drug’s primary or secondary qualities opposed those of the body in order to bring its constitution back to a moderate state.\(^{42}\)

For Fernel, the cure by contraries and the physics of matter–form remained appropriate to explain the powers of “occult” drugs, though in terms of total substance rather than primary or secondary qualities.\(^{43}\) On this point, he developed the Avicennian approach to the specific

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\(^{40}\) In a similar way to *Canon* 1.4, the three first books of the *Therapeutices* started with generalities before tackling bloodletting and purgation. The four following books discussed simple and compound drugs in the same vein as Avicenna’s *Canon* 2 and 5.

\(^{41}\) *Fernel* 1567, p. 409: “Calor enim noster medicamentum dum subigit, eius naturam, temperamentum et alias quascunque vires detegit et explicat: hoc vero quasi proritatum communi rerum omnium conditione reluctatur et obsistit, atque vicissim contagione corpus afficiens, omnes in id vires suas expromit”.

\(^{42}\) *Ivi*, p. 346: “Nam quum illa vel permistione vel contactu congruindiuntur, mutua actione sese obtundunt, suasque vires remittunt, ac neutrum omnino in alterius naturam, sed in medium quiddam facessit”.

\(^{43}\) On Fernel’s pharmacology of the total substance, see *Deer Richardson* 1985; *Gibbs* 2018, pp. 195-204.
form that was discussed in the *Canon*.\(^{44}\) According to Fernel, the main active power of “occult” remedies, including purgatives, antidotes and noxious drugs, came from their substantial form, which caused its hidden properties as a “third” faculty.\(^{45}\) It did so by opposing the poisonous substance through “antipathy” or by supporting the body’s substance through “sympathy”, rather than by processing a mixture of qualities. Following this reasoning, Fernel considered that the therapy of the total substance required to oppose the remedy’s total substance to that of the noxious substance. By acting through their substance, “occult” drugs and diseases had powerful effects as much for curing as for poisoning the body. In both cases, they targeted the body heat, the spirits and the vital organs.

The sympathy and antipathy that were operated by “occult” drugs involved the same process of “similitude of substance”. Following Hippocrates and Galen, Fernel took the example of purgative drugs to define the similitude of substance as a phenomenon of attraction between two substances, in the same way as the roots of a plant drew on nutriment, the magnet attracted iron, and amber attracted straw.\(^{46}\) By similitude, Fernel meant resemblance rather than identity. In fact, the remedy’s substance needed to be stronger than the body part to attract. In the medical tradition, this type of properties was defined as “occult” to the extent that it could not be detected by color, taste, odor or any sensory quality, but only through its noxious or healing effects.

As Fernel explained the active powers of “occult” drugs, he still had to justify their presence within healing and poisonous substances. According to his interpretation of physiology and pathology, these “occult” properties came from the innate heat, as a vital principle related to the total substance of living beings. However, the innate heat disappeared after death, leaving the sole material body that was made of elements. This meant than any remedy made of dry plants or dead

\(^{44}\) On Avicenna’s concept of specific form in pharmacology, see McVAUGH 2003; WEILL & PAROT 2004; CHANDELIER 2009; GIBBS 2018; COPENHAVER 1984.

\(^{45}\) FERNEL 1567, p. 416: “Tertia medicamentorum facultas de qua mihi dicendum restat, non e temperamento, non e materia, sed e tota rei substantia atque forma primum ac per se proficiscitur: ac proinde occulta totius substantiae proprietas appellari solet”.

\(^{46}\) Ivi, p. 391: “Quanquam igitur attraction [...] totius substantiae, similitudine fit, quae tamen a medicamentis purgantibus est, una similitudinis proprietate completur, qua et stirpes succum e terra sibi idoneum, et unaquaque corporis particula id quod in sanguine sibi familiare et conveniens est, et lapsi Heraclius ferrum, et paleas succinum prolectat.”
animals would be devoid of medicinal properties of the total substance. However, Fernel argued, vegetal and animal bodies partially kept some secret powers after death. These powers were “implanted” in their body and remained in their total substance, as was testified by the powers of cooked ingredients. Nonetheless, these hidden properties needed to be activated and preserved by a specific preparation, which will be further considered in the last section of this chapter. In the meantime, I will now turn to the type and effects of “occult” drugs.

**Types of “Occult” Drugs**

Fernel expounded diverse types of “occult” drugs, which acted through their third faculty related to their total substance. Established in Galenic pharmacology, these drugs aimed to move the targeted humors by purgation or evacuation, or to transform the substance of the body part. As Fernel explained, they had the ability to operate antipathy towards the disease by splitting up its total substance. A common example of these drugs was purgatives (*purgantia*), which caused vomiting or defecating. Some were noxious, e.g., scammony and colocynth, while others were “neutral”, e.g., rhubarb and agaric. Benign purgatives included medicinal food, such as prunes and violets. The “evacuative” drugs (*evacuantia*) had a similar effect to that of purgatives, but attracted a specific humor, for instance by drawing it from the brain through the mouth, the palate or the nostrils, or from the womb through the cervix. Evacuative drugs could also include alexiteres and *alexipharmaka* (antidotes), which attracted or repelled poison by similitude of substance.

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47 Fernel 2005, p. 708: “Multorum nihilominus vires eousque penetraverunt, ut non solum in spiritu et in tenui substantia, verum etiam in crassiore materia et in tota substantia firmius inhaerescant, permaneantque abeunte totius forma, illiusque temperamento dissoluto. Nam quae ex herbis, aut ex aliis purgantibus medicamentis aqua vaporario elicitur, purgandi vim etiamnum retinet, aut deleteriam si herbae in deleterius fuere”.

48 On purgative, evacuating and altering drugs related to the total substance, see Fernel 1567, pp. 416-417.

Fernel explained the mode of action of purgatives and evacuative drugs during digestion, at the level of humors and “vapors.” Their hidden property remained in potentiality and needed to be activated by the body heat to attract the targeted humor. The matter of purgative drugs was broken up and warmed up by the stomach heat, which released the drug’s third faculty. The medicinal substance in the stomach and the intestines attracted the noxious humor in order to evacuate it naturally. Through a purgative “vapor”, it spread through “hidden”, that is minuscule, ducts, and finally reached the poison. The vapor “cut” the latter and prompted the body part to evacuate it by antipathy. As for the drug material, it did not get through the poisonous humor and might even remain intact in the stomach or in the intestines, as shown in the vomit or feces.

In addition to purgatives and evacuative remedies, “alterative” drugs (alterantia) destroyed the total substance due to their hidden property. They comprised poisons and antidotes. By “poison”, Fernel meant any noxious substance acting on the body’s total substance due to an “occult” property. Their substance attacked the vital parts and dissipated their force by overwhelming the body heat and corrupting the substance of all faculties. In contrast, antidotes counteracted the action of poison by overcoming its total substance. They could cure or prevent pestilential diseases, heal venomous bites, or act on specific body parts by similitude of substance, for instance sage on the brain, bugloss on the heart and agrimony on the liver. Conversely, some drugs were toxic only to specific parts by similitude of substance, e.g., sea hare on the lungs and cantharides on the bladder.

Across Fernel’s theoretical and practical works, such categories of purgatives, evacuative and alterative drugs were present in the pharmacological prescription for pestilential diseases. They were accompanied by a series of recommendations regarding the therapeutic method.

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50 FERNEL 1567, p. 393: “Dum enim ventriculi calore medicamentum teritur, calefit, omnique ratione exagitatur, tacita eius facultas quasi solutis vinculis exurgens se promit proferitque vires novas. Ac tum vapor ea ipsa facultate praeditus illinc proelios, per caecos occultosque ductus in omnes corporis partes quoquooversum effusus, ad noxium humorem pertingit. Atque is humorem iamdii fortasse parti consuetum ac quiescentem, acrimonia incidit praeparatque, et adversa qualitate partis naturam acrius stimulat proritatque ad excernendum.”
Method, Observation and Experience

Fernel proposed his Theraeutics as a methodical and legitimate approach to therapy, which reflected the superiority of medical knowledge to that of apothecaries and herbalists. In his view, a firm knowledge of drug properties and the patient’s temperament were fundamental to prescribe an efficient treatment. As stated by the Galenic tradition, the physician had to define the remedy’s type, quantity and use according to the patient’s constitution and lifestyle. Moreover, the knowledge of drug powers relied on the use of both reason and experience, in particular, through the senses and constant observation. Fernel followed this reasoning by insisting on the role of reason and method in planning therapy and composing remedies.

However, the diseases and drugs related to the total substance escaped as much the senses as reason. Only their effects could be known by observation and experience. Nonetheless, Fernel advised, the physician could still apply a method to appraise the efficiency of his “occult” therapy. This method included a series of therapeutic steps covering the treatment of the sick patient and of the corrupted air. Each of the applied remedies acted through its total substance by cleaning the ambient air and, if needed, the patient’s wounds, by purging the body from the infection and by fortifying the “spirits”.

The first step of Fernel’s method for curing pestilence consisted in assessing whether the patient suffered from a complicated form of “occult” disease, that is a disease accompanied by a secondary infection. The complications required to be treated before the application of any

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51 FERNEL 1567, p. 348: “Haec non iam simplex, sed methodica curatio est, quae non solis remediis, sed via utendique ratione completur. Hac una maxime herbariis atque pharmacois, quibus etiam cognita est remediorum materia, medicus est praestantor”.

52 FERNEL 1567, p. 351: “Expugnando morbo paria quodam modo opponenda adhibendaque sunt remedia. Ut tria erant ex quibus medendi ars constituebatur, remedii genus, quantitas et utendi ratio; ita tria sunt ex quibus illa nosse oportet, affectus species, magnitudo et partis cui insidet conditio. [...] Hic autem ex laborantis natura, ex aetate et consuetudine deprehenditur”.

53 On the Galenic method in pharmacology, see JACQUES 1997; McVAUGH 2003.

54 FERNEL 2005, p. 722: “[...] facultates quae totius substantiae proprietate fiunt, a metodo et ratione alienas esse [...]. Illas enim non ratione ab odore vel sapore, sed sola experientia invenire possis. [...] Itaque occultae facultates quae manifesta demonstracione sciri haud possunt, metodo tamen et ratione ad morborum curationem adhibendae sunt”.

55 IV1, pp. 724-733.
“occult” remedy. Then, the physician could move on identifying and healing the efficient cause of the pestilential disease. The ambient air was purified by a fire, perfume or vapor with strong properties of the total substance. Inhalation was recommended to clean the patient’s lungs and heart. The poisonous substance of disease within the body was also treated by a suitable regimen and medication in order to drain the infection before it got stronger and reached the viscera. If the patient had sores, such as bubos, these were extracted by ligature, suction or poultry, whose substantial heat and spirit attracted the poison. A sponge soaked with a solution of salt and vinegar was applied to the clean wound. Further surgical treatment by scarification, cupping glasses, plasters and cauterization might also be used to disinfect the wounds. The last step was to remove any remaining infection with a “manifest” drug with first and second faculties, for instance, cold and astringent potions.

Fernel considered that his therapeutic method required to be adapted to the patient’s individual condition in order to ensure its safe and effective process. The investigations on the effects of “occult” drugs were to be gathered and confirmed by long observation and the medical authorities. In the case of hidden drug properties, Fernel specified that the term “experience” designated the observation of recurring effects regarding a same phenomenon over time. This implied that the physician had to try the effects of new drugs many times before determining if it actually had third faculties. The detailed appraisal of the remedies under trial remained at the appreciation of the physician.

To this traditional protocol, Fernel added that the knowledge of the stars had a critical impact on therapeutic method. From his account of pestilence, we know that he stated the influence of celestial bodies on health and longevity. Although Fernel acknowledged that astrology had been discredited by superstitious believes, he insisted on its relevance for medical purposes, since the properties of natural beings were maintained by the motion and powers of celestial bodies. Most notably, the stars affected living bodies through their vital principle, the “innate heat”,

56 FERNEL 1567, p. 417: “Experiri est quippiam effectu probare. […] Haec igitur rerum notio quae ex crebra eventuum observatione habetur, proprie dicitur experientia […]. Non quod semel duntaxat, sed quod identidem atque similiter et eadem rerum omnium concursione saepius evenerit, experientiam gignit”. See also FERNEL 2005, pp. 734-735.

57 Ivi, pp. 700-705.
which had a celestial origin. Such an astral influence was particularly important for medical practice. Each body part, disease and remedy were impacted by a specific combination of stars and planets.\textsuperscript{58} In pharmacology, this suggested that the moment of picking, storing and using plants as medicinal “simples” was conditioned by the configuration of the stars. However, in the same way as Fernel did not provide practical details on the astrological pattern for pestilence, he did not develop the connection between pharmacy and astrology any further, nor did he mention this question for the treatment of pestilence in his \textit{Consilia}.\textsuperscript{59} In closing my investigation on the treatment of pestilential diseases, I shall now turn to the latter treatise in order to appraise how Fernel applied his therapeutic method.

\textbf{Curing the Patient: A Case Study on Sweating Fever}

Whereas diverse explanations of the origin and transmission of pestilence had flourished from Antiquity to the Renaissance, its very cure remained unchanged over centuries.\textsuperscript{60} As Vivian Nutton has pointed out, the pathology of plague and pestilence, in particular, the notions of seeds, “occult” cause and total substance, was merely an intellectual framework for the learned physician.\textsuperscript{61} In medical practice, the impact of this theoretical framework was limited to focusing on the multiple ways of treating the patient and purifying the ambient air. If this observation is relevant in the case of Fernel’s pharmacological and therapeutic considerations, his therapy was remarkable for its consistent application of the “occult” explanatory framework to every step of the process, including the choice and preparation of ingredients.

\begin{flushleft}
\textsuperscript{58} Ivi, pp. 704: “[…] recte philosophantium sententia […] docetque pariter qui plane-tae et quae sidera unicumque corporis particulae, et quae unicuique tum animantium tum stirpium generi prae-sint: quae siderum consociatio morbos ingeneret, quae salutaria profligandis illis remedia ferat. Hac inspectione cognitioneque rerum, mox ratione comprehenditur, quod omni tempore rerum proprietates cum mundi spiritu illabuntur, insuntque rebus efficacissimae, et quando herbas stirpesque singulas legere, quando componere, quando ad curationem adhibere expedit.”

\textsuperscript{59} Fernel only alluded to finding the right time for bloodletting and purgation according to the stars in his \textit{Therapeutics}: FERNEL 1567, pp. 378 and 402.

\textsuperscript{60} On plague treatment in medieval and early modern times, see STEVENS CRAW-shaw 2016, pp. 151-181; NOCKELS 2007; HEINRICHS 2017.

\textsuperscript{61} NUTTON 1983.
\end{flushleft}
In his *Therapeutices*, Fernel recommended different types of treatments and remedies to heal “occult” diseases of the total substance, including some dedicated drugs to pestilence. But how exactly should a doctor select and apply these various drugs and treatments? Fernel provided an answer to this question in a practical case of pestilential illness. The treatment, which he gave in 1550, along with two of his colleagues at Paris, Jacques Houiller (c.1498–1562) and Jacques Dubois (1478–1555), was presented in a collection of practical recommendations, the *Consiliorum medicinalium liber* [*The Book of Medicinal Advice*], posthumously published in 1582 and re-edited till 1644. Rooted in the eponymous medical genre, Fernel's *Consilia* were a collection of therapeutic advice requested by a series of former patients. By summarizing the causes, symptoms and treatment of common and remarkable illnesses, the collection anchored medical practice in theory by offering didactic insight into pathology, pharmacy and therapy.

Fernel’s reported patient, the English ambassador (*legatus Anglicus*), was concerned with the “English plague” (*pestis Anglica*), namely the “sweating sickness” that had been spreading in Europe from the late fifteenth to the mid-sixteenth centuries. While the very nature and outbreak of this disease have remained mysterious to historians, the symptoms were described as a mixture of cold, fever and exhaustion, leading to a quick death. As Fernel introduced the case, he did not fail to explain the nature, cause and treatment of this affection as a pestilential disease related to the total substance. Formulated as a detailed prescription, the therapeutic protocol served to either prevent or cure the disease.

**Therapeutic Procedure**

As Fernel explained, the English plague was an epidemic fever with the remarkable symptom of sweating. It caused the decay of humors,

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62 FERNEL 1585, pp. 137-140.
64 On the sweating sickness, see CARLSON & HAMMOND 1999.
spirits and, in the most serious cases, of the whole body. As a pestilential disease, it was due to the corruption of the heavens transmitted by the air through the wind, earthy exhalations or another poisonous cause. The therapeutic protocol described in the *Consilia* matched Fernel’s method for curing the “occult” diseases, including pestilence, in *De abditis rerum causis* and *Therapeutices*. It consisted in cleaning both the ambient air and the patient’s body as well as giving a specific medication and diet.

The physician had to prevent or repel the poisonous quality of air, whose total substance had pestilential properties. The cleaning of air was ensured by ventilating the room with fans and by making a fire in the patient’s bedroom. The materials used for the fumigation mostly included dry leaves, flowers, seeds and roots of fragrant plants. Such a purified air, Fernel insisted, should be kept clean and free of any human breath transporting the reservoir or “seedbeds” (*seminaria*) of pestilence.

The purification of air was coupled to internal cleansing in order to empty the body of any excremental or decaying substance. A purgative potion, based on aromatics, spices and sugar, was to be taken the first day of therapy on an empty stomach. Six days later, a bloodletting should be applied to the basilic vein of the arm or, if the patient was averse to phlebotomy, a light diet. Additional medication in the form of pills composed of plants, spices, gum resin and clay, was advised up to three times a week.

Besides purgatives, a fortifying treatment was recommended to help the vital organs and faculties to counter the malignant contact of air. As Fernel claimed, his recipe of *alexipharmakon*, approved by both reason and experience, was based on a complex mixture of theriac, plants, spices,
and minerals, including precious gems and gold. Prepared by distillation, these ingredients were to be taken up to three times a week.

Lifestyle was also part of the recommendations to prevent or cure pestilential diseases.\(^{70}\) To evacuate the malignant sweat, gentle workout was practiced in the morning with an empty stomach. Moreover, the patient should have a moderate diet. Meat, mostly in the form of roasted game birds, needed to be prepared in the juice of citrus fruits and seasoned with aromatics. Fish should be dry and crumbly after cooking. Whereas red or white wine of mediocre strength was allowed, beer was to be avoided because of its moistening and melancholic properties. Milk was to be avoided too because of its tendency to become corrupted, although old cheese was permitted for its warming effects. Fruits were tolerated only in the form of spreads, especially made of figs, whose cleaning properties were praised, along with those of almonds. On top of that, preserves of flowers, fruits and aromatics were recommended on a regular basis. They could be steamed in distilled wine with theriac, mithridate, Armenian bole, among other ingredients, before their preparation as an opiate.

The recommended treatment thus aimed to systematically cover all aspects of therapy, including fumigation, bloodletting, medication, workout and diet. All these parameters were supported by Fernel’s explanation of pestilence and its multiple ways of affecting bodies. They also involved a series of determined ingredients and preparations, which I shall now examine.

### Cardiac Drugs and Antidotes

In his *Consilia* and *Therapeutices*, Fernel adopted the traditional Galenic pharmacopoeia of simple and compound drugs.\(^{71}\) The simple drugs were individual ingredients which featured first, second or third faculties. They were used either alone or mixed with other simples into compound drugs. Mostly based on plants, simples also included mineral and animal substances. The classification of simples had existed since Antiquity, with Pliny’s *Naturalis historia*, Dioscorides’ *Materia medica*,

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\(^{70}\) Ivi, p. 139: “Mane vacuato corpore partes omnes motibus clementibus exerce, quibus si sudor blandus superveniat, linteis mollibus tergendus est. Ab hoc ubi corpus deferbuerit, cibum sumes coctu facilem, sed paulo parciorem solito”.

\(^{71}\) Ausécache 2006.
Galen’s and Avicenna’s pharmacological works. They were developed in pharmacopoeias and antidotaries published in the Latin West, by physicians ranging from Matthaeus Platearius’ *Circa instans* to Valerius Cordus’ *Dispensatorium*. In the fifth book of his *Therapeutices*, Fernel classified simples for internal use according to their effects on the body part and the four humors, and according to the organ to be treated.\(^72\)

In his therapy of sweating fever, Fernel gave priority to drugs that healed the main organ targeted by pestilence and poison: the heart. Dedicated “cardiac” (*cardiaca*) drugs expelled this type of affections and fortified the body’s spirits thanks to the properties of their total substance. The pharmacological theory of cardiac remedies had been diffused by Avicenna in his treatise *De viribus cordis* [On the Forces of the Heart], which was appended to the Renaissance edition of the *Canon* and at times translated as *De medicinis cordialibus* [On Cordial Remedies].\(^73\) Fernel also expounded on this category in his *Therapeutices*.\(^74\) The listed simple and compound cardiac drugs were the basis for the therapeutic protocol of the *Consilia*. They encapsulated the variety of ingredients used in pharmacy, including plants (bugloss, sorrel, tormentil, thistle, scabious, aloes), citrus fruits, spices (saffron, cinnamon, clove), animal products (musk), gems (pearl), clay (*terra sigillata*, Armenian bole), resin (amber) and precious metals (gold).

Across Fernel’s therapeutic protocol, lemon and bugloss – both cardiac simples – were the most recurring ingredients for the making of potions, pills, *alexipharmaka* and distillates. Regarding diet, meat had to be marinated in the juice of citrus fruits and seasoned with cardiac plants. In addition to cardiac simples, other “occult” drugs with a strong third faculty played a part in Fernel’s *Consilia*. Among them, common purgative plants, such as cassia and rhubarb, entered in the composition of the purging potion at the beginning of therapy. The fragrant plants used for fumigation aimed to purify the corrupted air and to protect, by inhalation, the patient’s lungs and heart from pestilence thanks to the powers of their total substance (rosemary, sage, aloes, cloves, styrax) and their hot qualities (juniper, laurel, marjoram, thyme).\(^75\)

\(^72\) Fernel 1567, pp. 441-481.
\(^73\) On Avicenna’s *De viribus cordis*, see McVaugh 2009; Weill & Parot 2010.
\(^74\) Fernel 1567, p. 468: “Quod affectus pauci in cor invadere posse credantur, cardiacae facultates praeceptu sunt, noxia omnia malignaque depellere, et cordi robur conferre”.
\(^75\) On drugs with hot properties, see Fernel 1567, pp. 464-465.
Most of the ingredients mentioned in Fernel’s *Consilia* comprised local plants that were geographically and financially accessible in Western Europe, such as bugloss, sorrel, tormentil, thistle, scabious and borage. But the therapy also included luxury and often exotic plants (aloes, santal, roses), fruits (dates, almonds, lemons, oranges), spices (cinnamon, saffron, turmeric, clove), resin (myrrh), game (thrushes, partridges, hares, roebucks), precious stones and metals (pearl–based *diamargariton*, gold), which were all mentioned in Greek and Arabic pharmacology. The most expensive simples in Fernel’s *consilia* on the sweating sickness entered in the composition of a particular *alexipharmakon*, which much seemed like an augmented version of theriac and mithridate. Both included in his *Therapeutices*, theriac and mithridate were the main compound drugs for treating plague and pestilence in early medicine.\(^\text{76}\)

Outside of the existing remedies for pestilential diseases, physicians might also create new compound remedies by combining simples. Some new properties might emerge from the “fermentation” (*fermentatio*) of the initial ingredients after the mixture of their elements.\(^\text{77}\) However, physicians were not able to anticipate these effects, especially their third faculties, which required experience through multiple trials and observation – an idea which had been put forward in Avicenna’s *De viribus cordis*.\(^\text{78}\) For Fernel, the art of composing drugs also justified the prominent place of the learned physician for making diagnosis and prescription. While physicians had the knowledge and experience for prescribing medication and setting the composition of drugs, apothecaries were only required to diligently select and prepare these ingredients.\(^\text{79}\)

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\(^\text{76}\) On theriac in the late Middle Ages, see Nockels 2007. In his *Therapeutices*, Fernel proposed an affordable version of theriac based on four ingredients (*diatesseron*), in addition to a traditional recipe based on more than fifty ingredients, including snake, opium and balsam: Fernel 1567, pp. 538-539.

\(^\text{77}\) Ivi, p. 424: “At vero cum multorum in compositione iamdiu facta est confusio, atque ea quam iuniores fermentationem appellant, mutua actione omnium quaedam coitio atque concursio evaserit, pristinae singulorum vires non amplius integrae manent, neque illas potest facultas uma seiungere: sed pereuntibus et extinctis singulorum viribus, novae prorsus emergunt, ex illarum tamen concursione profectae”.

\(^\text{78}\) McVaugh 2009.

\(^\text{79}\) Fernel 1567, p. 424-425: “Simplicium autem cognitio, collectio, delectus, expurgatio, conservatio, praeparatio, correctio et miscendi industria, seorsum ad pharmaco-paeos referuntur ac pertinent: quorum tamen imprimis et medicum gnarum peritumque esse oportet, siquidem apud artis ministros auctoritatem dignitatemque suam retinere ac tueri velit [...]”.
Preparation: Potions, Pills and Distillates

Fernel's *Consilia* proposed remedies in various medicinal forms, from potions to pills to distilled wines and electuaries. In his *Therapeutices*, he explained that the texture and preparation of drugs could stimulate or soften their initial powers. For instance, moisturizing and emolliating properties were present only in fresh simples containing a lot of humor, such as fruits and seeds. Their powers were more efficient in a broth, juice or oil. Desiccant and cleansing properties could be found in dry ingredients. Moreover, liquid drugs like potions had purging and penetrating properties, while solid drugs like pills were mostly attracting and fortifying.

Among internal remedies, solid drugs could be made in the form of powder, pastille, electuary (electuarium), bolus, eclegma, confection (confectio) and preserve (conditum). Liquid drugs could be prepared in the form of decoction, infusion, wine, broth, emulsion, juice and syrup. These different forms were often associated to the mode of extracting powers, mostly, by means of infusion, “elixation” and distillation. Infusion, for its slow and moderate cooking, better conveyed the powers without dissipating those of “thin” matter, so that the plant juice coming from infusion could keep all of its faculties. “Elixation” (boiling) attracted the powers of “thick” matter inside the broth, while dissipating the powers of “thin” matter.

Distillation had an important role in the extraction of drug powers in Renaissance pharmacy. In *De abditis rerum causis*, Fernel suggested that such a technical “art” (ars) was key in the therapy of the total substance. As Sylvain Matton’s has shown, some alchemical processes, which had been explored by Ficino and Augurello, were discussed in the end of this treatise. Fernel’s considerations prompted numerous commentaries in alchemical literature from the late sixteenth to the mid–seventeenth centuries, for instance by the German physicians Andreas Libavius and Michael Maier. The bone of contention was about his support of the alchemical practice of chrysopoeia, that is the transmutation of metals. Fernel, indeed, suggested the possibility of distilling some “quintessence.”

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80 Ivi, pp. 422 and 424-425.
Called “philosopher’s stone”, “elixir of the Arabs” and “seed” for generating gold, this quintessence was allegedly extracted from gold and mercury. However, Fernel immediately mocked this alchemical process as a vain quest for money and gold.

Beyond his ambiguous position regarding chrysopoeia, Fernel supported the use of alchemy for medicinal purposes along the lines of Renaissance physicians. He described alchemical practice as the “separation” of three substances from plants and animals. Such “water”, “oil” and “ash” were extracted from their raw material, which consisted in the four elements. Although these alchemical products were mixed compounds, Fernel considered them as having a purer nature due the strong presence of their total substance and weakness of their secondary qualities. He particularly insisted on the beneficial effects of distilled vegetable oil, whose flavor and odor evidenced a powerful total substance.

This oil corresponded to the plant’s “radical moisture” (humor primigenium), which the Latin–Arabic medical and alchemical literature described as a fatty humor present in all living beings, with strong restorative powers. The technical operations of distillation were further described in a dedicated chapter of Fernel’s Therapeutices.

Fernel also acknowledged the possibility of distilling minerals, especially gums, resins and metals, but stated that it required intensive work only to obtain a very small amount of precious oil. Nonetheless, gold leaves and pearl powder, as longstanding ingredients of ancient materia medica, were part of his prescription of the distilled alexipharmakon for the sweating sickness in the Consilia. Some “philosopher’s egg” (ovum

82 Fernel 2005, pp. 710–713.
83 Ivi, pp. 712-713: “Efficaciorem in oleo […]: illud siquidem et odore, et sapore totius substantiam referens, propria sedes dignoscitur insiti spiritus et caloris, in quibus proprietas tota subsistit foventurque”.
84 Fernel 1567, p. 425: “[…] stirpis cuiusque materiam humorem continere […] primigenium, in quo praecipua vis inest […]. Oleum vero humidi est primigenii portio aeria, atque ut illius odorem saporemque, ita et vires plurimum refert […].” On radical moisture in Renaissance medicine and alchemy, see Pomata 2018; Crisciani 2005.
85 Fernel 1567, pp. 425-426.
86 Fernel 1567, p. 426: “Hac ratione Halchymistae ex lachrymis, resinis, atque etiam metallis per humectationem oleum extrahunt purius et odoratus […]. Sed ad id longo opus est tempore et maxima diligentia, atque in moderando attemporandoque igni dexteritate summa: et ad postremum pro impensa opera ex pulveris libra dimidia vix puri et sinceri olei uncia elici potest”.
87 Fernel 1585, pp. 139-140.
Philosophicum) was also recommended in the treatise, as a well–known medication, though without any details.

Along with texture and odor, the pleasant taste of drugs was another important feature which ensured the smooth administration of the treatment. In his consilia about the sweating sickness, Fernel proposed some potions and electuaries whose composition included sweet and fragrant ingredients, such as sugar, fruits and cinnamon. Besides bringing a nice taste to remedies, these products had the convenient effect of fortifying the patient’s “spirits”. This was particularly useful for treating pestilence, which provoked the exhaustion of the body by attacking its physiological spirits. While reviving the patient during purgation and antidotal treatment, the sweetness of remedies offered an appealing and comforting dimension to the whole therapeutic experience.

**Conclusion**

In applying his theory of the total substance to the explanation of deadly epidemic fevers, Fernel sought to elucidate the unknown, the unpredictable and the imperceptible in his medical philosophy. He did so by covering both theory and practice across the fields of pathology, pharmacology and therapy. Fernel’s account of pestilential diseases is particularly interesting in its integration of diverse explanations of contagion, “occult” causation, and astral influence that were proposed by ancient, medieval and Renaissance physicians. His explanation drew on Galen’s approach to the total substance and pathology of pestilence, which emphasized the corruption of air and the seeds of plague putrefying the body. However, Fernel deviated from this framework by ascribing the efficient cause of pestilence to some astral configuration, and its contagion to “occult” factors beyond dietetics. His conception merged late medieval and Renaissance interpretations on the astral causation of plague with the Avicennian interpretation of the total substance related to the specific form of bodies. According to Fernel, the total sub-

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88 Fernel 1567, p. 422: “Iucunditas porro quoad licet medicamentis comparanda, modo ut illorum vim et facultatem non tollat: tristia enim et horrenda nec sumuntur facile, nec continetur, sed ventriculum evertunt, corpus conturbant, ac plerumque animi defectione vires exolvunt. [...] Haec enim odoris iucunditate non modo oblectant, sed et corroborant, et corporis spiritus vehementer reficiunt, animumque exhilarant”. 
stance was the embodied instantiation of the celestial form of living beings, which was infected by the poisonous seeds of pestilence. This explanation was integrated into a Platonic framework, which highlighted the influence of the heavens on living beings, following the philosophy of Ficino.

Beyond his attempt to explain the unexplainable, Fernel provided a practical counterpart to his philosophical understanding of pestilence as an “occult” disease of the total substance. His conception of treatment continued the Avicennian medicine by putting forward the crucial role of experience in composing drugs and preparing therapy. Such an emphasis on practice was expressed by Fernel’s constant insistence on repeated trials and resort to observation. Technical skills were involved in the making of powerful drugs based on various vegetal, animal and mineral components. Alchemical distillation, in particular, allowed to extract the total substance of these ingredients, which partly remained implanted in their body after death. In explaining the hidden powers and making of drugs, Fernel also suggested to take into account the influence of the stars regarding each step of their preparation. Such an appeal for astral influence, alchemy and experience–based therapy did not only recapitulate the previous conceptions that were expounded by Galenic physicians. Diffused in the widely read Universa Medicina, Fernel’s account shaped alternative interpretations emerging in the early modern period, most notably, in Paracelsian medicine.
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LIST OF ERRATA

The following aims to correct editorial mistakes that occurred during the publication of this chapter.

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