CHAPTER 13

The Case of *Corallium Rubrum*. Controversies and Consistencies in the Interpretation of a Galenic Simple in Early Modern England

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Red coral has been harvested in the Mediterranean and traded around Europe and Asia as a form of medicine and jewellery since the Roman period as described by Pliny the Elder.[1] If we trace the perceived properties of red coral within ancient medicine, red coral held certain properties as cooling, binding and astringent, which continued to be valued in early modern England within the Galenic framework of medicine. This chapter explores the transmission of coral as a Galenic medicine across time and space, and how the benefits of coral were debated by medical authors and practitioners. While coral's perceived properties were presented within the

[1] Pliny the Elder. 2004. *Natural History: A Selection*, translated by John F. Healy (London and New York: Penguin Books), 281.

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Galenic framework by authors including Nicholas Culpeper (1616–1654), John Sadler (1615–1674) and James Primrose (1598–1659), chemical physicians such as Thomas Willis (1621–1675) also listed its benefits. Theophilus Garencières (1610–1680) and Richard Browne (1647/8–1693/4) went so far as to write specific treatises on the benefits of coral, drawing on chemical theories to explain coral's pharmaceutical action but treating remarkably similar conditions.[2] This chapter argues that while coral was conceptualised within both Galenic and chemical understandings of drug action, coral's perceived properties as a gentle, binding medicine ensured its enduring popularity.

Red coral can be identified as a 'Galenic simple': a single organic substance used singularly or in compound medicines within a Galenic theory of medicine. Simples were part of an extensive *materia medica* of plant, mineral and animal origin. The argument made by John Riddle and Paula de Vos that the perceived properties of some ancient *materia medica* were relatively consistent over time, despite changing medical theories, is particularly pertinent to this study of coral.[3] Scholars including Maria Do Sameiro Barroso, Christopher Duffin and Nichola Harris have explored the long history of coral's role in treating bleeding, febrile convulsions, teething and 'falling sickness' as an amulet and medicine in

[2] Garencières, Theophilus. 1676. *The Admirable Virtues, and Wonderful Effects of the True and Genuine Tincture of Coral, in Physick* (London: Samuel Sprint); Browne, Richard. 1699. *Coral and Steel: A Most Compendious Method of Preserving and Restoring Health, Or, a Rational Discourse, Grounded upon Experience* (London: Simon Miller).

[3] Riddle, John M. 1985. *Dioscorides on Pharmacy and Medicine* (Austin: University of Texas Press), xviii-xix; De Vos, Paula. 2010. "European Materia Medica in Historical Texts: Longevity of a Tradition and Implications for Future Use." *Journal of Ethnopharmacology* 132, no. 1: 28.

ancient pharmacological texts and medieval lapidaries.[4] Harris also highlights the influence of Galenic, Paracelsian, lapidary and mendicant beliefs on early modern print remedies and argues that the therapeutic use of red coral relates to the 'cultural trends' of the period, rather than to proof of efficacy.[5] While taking into account the various influences at play in the interpretation of red coral, this study seeks to understand how certain practising physicians developed their own coherent theories about coral's pharmaceutical action, rather than simply drawing on a patchwork of influences or explanations derived from Galenic, Paracelsian or iatrochemical writings.

By analysing a single Galenic simple, this chapter illuminates the complex landscape in which Galenic physicians fought to maintain control of medicine from perceived attacks from proponents of newer theories of pharmacology and drug action. It also argues that a focus on coral offers an opportunity to depart from the polemical texts of embattled Galenists and defiant chemical physicians and consider the motivations of doctors on the ground such as Theophilus Garencières, Richard Browne and John Pechey (bap. 1654-d.1718). In their publications, these physicians did not employ coral as a means to articulate an entrenched position, but rather interpreted coral's properties within a concurrent range of epistemological frameworks and with the desire to provide affordable medicines for the poor. As a simple familiar within the ancient medical pharmacopoeia, coral here highlights both continuity and change as its popularity as a medicine endured up until the 1800s.

[4] Barroso, Maria Do Sameiro. 2017. "Coral in Petrus Hispanus' 'Treasury of the Poor'." In *Geology and Medicine: Historical Connections*, edited by Christopher J. Duffin, Christopher Gardner-Thorpe, and Richard T. J. Moody, 267–282. (London: The Geological Society), 274–278; Duffin, Christopher J. 2022. "Margrave Anti-Epileptic Powder, 1570 to 1875." *Pharmaceutical Historian* 52, no. 1: 8–9; Duffin, Christopher J. 2013. "The Gem Electuary." In *A History of Geology and Medicine*, edited by Christopher J. Duffin, Richard T. J. Moody, and Christopher Gardner-Thorpe (London: Geological Society), 81–111; Harris, Nichola E. 2022. "The Protection of Innocents: Red Coral as a Lapidary Cure for the 'Children's Disease' and Conditions Related to Childbirth in Medieval and Early Modern England." In *Death and Disease in the Medieval and Early Modern World* (York: York Medieval Press), edited by Lori Jones and Nükhet Varlik (Martlesham: Boydell & Brewer), 265–282.

[5] Harris, "The Protection of Innocents", 291.

13.1 Methodology

This study analyses red coral as it was understood as a Galenic simple in early modern England. The presence of coral within the *London pharmacopoeia* of 1618 in receipts attributed to Galen indicate that coral was interpreted within the Galenic framework; however, the process of cross-referencing to genuine Galenic texts is not straightforward. The Galenic corpus itself presents a challenge, both in terms of what can be authoritatively attributed to Galen himself and the possibility of lost works and translations.[6] There seems to be no entry on red coral in Galen's *De simplicium medicamentorum temperamentis ac facultatibus* (*De simplicibus*) itself.[7] Barroso cites references to coral to treat broken teeth in *Galeni de remediis parabilibus*, Book 2 in Volume 14 of the Karl Gottlob Kühn edition, yet doubt has been cast on the authenticity of this text.[8] Coral is listed in the *Alphabetuum*, a manuscript widely attributed to Galen in the Middle Ages but now thought to have no credibility as a Galenic source. It was included in the *De simplicium medicamentorum ad Paternianum* section of the Giunta version of *Operaomnia* (1565) circulating in the early modern period, which contained both genuine and spurious Galenic texts.[9]

[6] See Petit, Caroline, Simon Swain, and Klaus-Dietrich Fischer, eds. 2021. *Pseudo-Galenica. The Formation of the Galenic Corpus from Antiquity to the Renaissance* (London: University of London Press); Nutton, Vivian. 2002. "In Defence of Kühn." *Bulletin—Institute of Classical Studies* 45, S77: 1–7; McVaugh, Michael. 2002. "The Lost Latin Galen." *Bulletin—Institute of Classical Studies* 45, S77: 153–162.

[7] My thanks to Professor John Wilkins at the University of Exeter for checking for references to coral during the immense undertaking of translating Galen's *De simplicibus*.

[8] Galen. 1821/1833. *Galeni de remediis parabilibus*. In Galeni Opera Omnia, edited by Karl Gottlob Kühn, Vol. 14. 22 vols. (Leipzig: Car. Cnoblochii), 432, 533; Barroso, "Coral in Petrus Hispanus," 269; Totelin, Laurence. 2021. "Easy Remedies—Difficult Texts: The Pseudo-Galenic *Euporista*." In *Pseudo-Galenica: The Formation of the Galenic Corpus from Antiquity to the Renaissance*, edited by Caroline Petit, Simon Swain, and Klaus-Dietrich Fischer (London: University of London Press), 35–41. I am grateful to Professor Vivian Nutton for alerting me to this issue of authenticity in the Kühn edition.

[9] Everett, Nicholas. 2012. *The Alphabet of Galen* (Toronto: University of Toronto Press), 7, 211; Ventura, Iolanda. 2019. "Galenic Pharmacology in the Middle Ages: Galen's *On the Capacities of Simple Drugs* and Its Reception between the Sixth and Fourteenth Centuries." In *Brill's Companion to the Reception of Galen*, edited by Petros Bouras-Vallianatos and Barbara Zipser (Leiden: Brill), 398–9; Fortuna, Stefania. 2019. "Editions and Translations of Galen from 1490 to 1540." In *Brill's Companion to the*

However, coral is listed in medicines to staunch bleeding in *De compositione medicamentorum secundum locus,* in Volume 13 of the Kühn edition, which is considered part of the Galenic corpus.[10] These recipes provide evidence of Galen's coral usage and reveal common combinations of red coral with other specific substances. It seems highly likely that Galen, as a keen traveller and avid collector of *materia medica*, had personally encountered Mediterranean red coral. Galen was also an enthusiastic reader of Dioscorides' pharmacopoeia which lists red coral and may hint at how Galen would have incorporated coral into his compound remedies.[11] Galen praised Dioscorides' work as 'the most perfect of all treatises on *materia medica*'.[12] As Dioscorides described the properties of coral within a framework sympathetic to Galen's understanding of drugs' action, as binding and cooling, we may combine Dioscorides' entry on coral with Galen's texts to understand the *functioning* of coral as a medicine within the Galenic framework.[13] While the omission of red coral from *De simplicibus* is interesting, this chapter does not attempt to offer an analysis of Galen's view on coral and its direct transmission to early modern England. Instead, the interpretation of red coral as a Galenic simple is based on the incorporation of red coral within Galenic compound medicines and its inclusion in the comprehensive body of *materia medica*, which were employed within the Galenic theory of drug action. This ensured red coral's enduring use in European and Arabic medicine.

While we cannot establish with certainty which texts physicians in the medieval and early modern period were citing when they attributed specific coral receipts to Galen, which could include spurious texts

Reception of Galen, edited by Petros Bouras-Vallianatos and Barbara Zipser (Leiden: Brill), 448.

[10] Galen. 1821/1833. *De compositione medicamentorum secundum locus*. In Galeni Opera Omnia, edited by Karl Gottlieb Kühn, Vol. 13. (Leipzig: Car. Cnoblochii), 78, 86–7; Petit, Caroline. 2017. "Galen, Pharmacology and the Boundaries of Medicine: A Reassessment." In *Collecting Recipes: Byzantine and Jewish Pharmacology in Dialogue*, edited by Lennart Lehmhaus and Matteo Martelli (Berlin, Boston: De Gruyter), 53; Ventura, "Galenic Pharmacology", 394.

[11] Temkin, Owsei. 1973. *Galenism: Rise and Decline of a Medical Philosophy* (Ithaca: Cornell University Press), 14; Dioscorides. 2017. *De Materia Medica*, translated by Lily Y. Beck (Hildesheim: Olms-Weidmann), 389–90.

[12] Cited in Riddle, *Dioscorides on Pharmacy*, 169.

[13] Dioscorides, *De materia medica,* 390.

deemed "Galenic" and also lost Galenic texts, we may assume that they interpreted the therapeutic benefits of red coral within a broad understanding of Galenic pharmacological action, and with reference to Galen's works such as *De simplicibus, De methodo medendi, De compositione medicamentorum secundum locus,* and *De temperamentis*.[14] Analysing examples of coral receipts attributed to Galen circulating in medieval and Renaissance manuscripts and translations, also reveals why coral would continue to be valued as a Galenic simple by the 1600s. However, evidence of coral in seventeenth-century English medical texts demonstrate a tension between its perceived benefits as a Galenic simple and new ways of interpreting them.

This chapter therefore adopts an expansive approach to the term 'Galenic simple', asserting that interpreting patterns of red coral usage understood to be Galenic presents common themes and valuable insights into both continuity and change. Firstly, we encounter coral within receipts in *Pharmacopoeia Londinensis* attributed to Galen and consider the availability of red coral through trade and retail networks. The second section identifies common themes present in 'Galenic' texts and explores how the pharmaceutical action of red coral might be understood by physicians schooled in Galenic theory. Moving to the dynamic medical landscape of the seventeenth century, I consider how medical writers asserted coral's role within Galenic or chemical medicine, grappling with medical innovation as novel theories of drug action emerged. While some physicians feared that familiar stalwarts such as coral would be lost amidst demands for new medicines, doctors working in urban contexts such as Theophilus Garencières and Richard Browne developed coherent strategies to utilise coral, drawing on iatrochemical concepts of acids, alkalis and fermentation to interpret coral's properties while continuing to refer to Galenic precepts. A focus on red coral as a Galenic simple thus reveals how physicians in the mid to late seventeenth century continued to draw on some elements of Galenic pharmacology even while simultaneously modifying and rejecting other aspects, reflecting the pluralistic medical landscape of the period.

[14] See Durling, Richard J. 1961. "A Chronological Census of Renaissance Editions and Translations of Galen." *Journal of the Warburg and Courtauld Institutes* 24, no. 3/4.

13.2 Galenic Medicine in Early Modern England

The significance of Galenic texts or texts attributed to Galen to early modern English medicine cannot be overstated.[15] Discovery of ancient texts and Latin translations during the Renaissance made Galen's works accessible to a scholarly audience in print, and the principles of Galenic medicine were also summarised into briefer texts such as Giovanni Battista Da Monte's *Medicina Universa* (1589) and Santorio Santori's *Methodi Vitandorum Errorum…Libri XV* (1603).[16] A knowledge of Galen's doctrines was deemed fundamental to licensing as a physician and Galenic texts held 'sacred' importance for the College of Physicians, acting as a source of authority akin to the Bible's significance to the Church.[17] John Caius (1510–1573), President of the Cambridge College and compiler, annotator and publisher of Galenic manuscripts, was dedicated to searching for Galenic texts in Greek and sharing their wisdom.[18] Humoral theory was central to popular and intellectual understandings of medicine and people sought to achieve the perfect *crasis* of bodily humours with appropriate treatments, diet, exercise and allopathic remedies.[19]

[15] For scholarship exploring the accessibility of Galenic texts to physicians in the Latinate West and establishing how Galenic medicine became embedded in English cultural understandings of medicine during the Renaissance, see Temkin, *Galenism*; Lieber, Elinor. 1981. "Galen in Hebrew: The Transmission of Galen's Works in the Medieval Islamic World." In *Galen: Problems and Prospects*, edited by Vivian Nutton (London: Wellcome Institute for the History of Medicine, 167–186; Everett, *The Alphabet of Galen*; McVaugh, Michael. 2019. "Galen in the Medieval Universities, 1200–1400." In *Brill's Companion to the Reception of Galen*, edited by Petros Bouras-Vallianatos and Barbara Zipser (Leiden: Brill), 381–392; Ventura, "Galenic Pharmacology"; Fortuna, "Editions and Translations"; Nutton, Vivian. 2019. "Renaissance Galenism 1540–1640: Flexibility or Increasing Irrelevance?" In *Brill's Companion to the Reception of Galen*, edited by Petros Bouras-Vallianatos and Barbara Zipser (Leiden: Brill), 472–486.

[16] Fortuna, "Editions and Translations"; Wear, Andrew. 2000. *Knowledge and Practice in English Medicine, 1550–1680* (Cambridge: Cambridge University Press), 21.

[17] Pelling, Margaret, and Frances White. 2003. *Medical Conflict in Early Modern London: Patronage, Physicians and Irregular Practitioners, 1550–1640* (Oxford: Clarendon Press), 242; Kassell, Lauren. 2007. *Medicine and Magic in Elizabethan London* (Oxford: Clarendon Press), 86.

[18] See 'John Caius and the Eton Galen' in Nutton, Vivian. 1988. *From Democedes to Harvey: Studies in the History of Medicine* (London: Variorum Reprints), 227–252.

[19] Wear, *Knowledge and Practice*, 37–40.

In the seventeenth century, Galenic medicine and the College of Physicians faced challenges from two angles: competition from thriving medical practices of 'irregulars' (unlicensed medical practitioners) and criticism from 'moderns' including Paracelsians, Helmontians and mechanical philosophers.[20] Medicines became increasingly important as a focus of medical interactions, with debates regarding the efficacy of Galenic and chemical medicines and attempts to evaluate new medical ingredients from abroad and their suitability for English constitutions. However, while the language of medicine was modified in the 1660s, Andrew Wear argues for the acknowledgement of 'continuity and agreement' alongside the 'grand narrative' of conflict and change.[21] Indeed, Vivian Nutton suggests that Galenic medicine was not a rigid framework and survived challenges to its credibility up until the eighteenth century.[22]

In the *Pharmacopoeia Londinensis* (1618), red coral appeared in recipes for emplasters, syrups and a coral troche, 'Trochisci Diacoral' directly attributed to 'LI V Galeni', though no book title is cited.[23] This receipt includes red coral, pomegranate flower, starch, Lemnian earth, hypocistis, henbane, opium, and plantain juice. The medical application of the medicine was intentionally omitted to protect the role of physicians in a competitive medical marketplace. The list of simples in the *Pharmacopoeia Londinensis* established what apothecaries could sell and the inclusion of red coral in the pharmacopoeias throughout the seventeenth century suggests that it was widely available during this period.

Red coral was implicated in global trade networks. Coral fishers from Livorno, Genoa, Marseilles, and Naples harvested red coral in great quantities from banks on the coasts of North Africa, Sardinia, Corsica, Sicily, and the Gulf of Naples. Much of the coral was shipped to the Levant, India, China, and the West Coast of Africa by English, French, Dutch, or Portuguese merchants seeking to trade for spices, gemstones, porcelain,

[20] See Pelling and White, *Medical Conflict*; Debus, Allen G. 1965. *The English Paracelsians* (London: Osbourne); Wear, *Knowledge and Practice,* 34–39.

[21] Wear, *Knowledge and Practice,* 3, 366.

[22] Nutton, "Renaissance Galenism".

[23] College of Physicians of London, *Pharmacopoeia Londinensis*, 27, 124, 168.

and slaves.[24] While we know some red coral was destined for the English domestic market and Port of London rate books provide an indication of the quantities of coral imported and exported in certain decades, these records are patchy and do not specify intended usage.[25] However, *The Book of Values of Merchandise Imported* (Edinburgh, 1657) does helpfully specify the form, intended use and relative value of coral in Scotland: 'Beads of coral the pound, £1, 10s', 'Drugs called Coral whole, the pound, 10s', 'Drugs called Coral, red or white, in fragments, for Physical use, the pound, 1s, 4d'.[26] The higher value of the whole coral suggests that it had more potential uses, while fragments could only be ground up as powder. As Scotland was not involved in the coral trade, these statistics give an indication of the coral products available to the domestic market for purchase by apothecaries and jewellers.

Coral was considered a relatively expensive medicine. Nicholas Culpeper suggested limiting the dosage as it may be 'too much for the purse' and gave quantities in 'grains', while physician Gideon Harvey advised readers to pay no more than 4 shillings per pound for red coral.[27] The accounts of Ernst and Coningby (1661–1675), a London apothecary company, show the price they paid for red coral varied according to quality, ranging from 14d to 2 s 8d for 'fine' red coral in 1661.[28] The expense of coral could be justified by its broad applicability. Simon Werrett's research on 'Thrifty Science' in early modern England highlights the perceived benefits of medicines which had multiple uses,

[24] Trivellato, Francesca. 2012. *The Familiarity of Strangers: The Sephardic Diaspora, Livorno, and Cross-Cultural Trade in the Early Modern Period* (New Haven: Yale University Press), 224–232; Yogev, Gedalia. 1978. *Diamonds and Coral: Anglo-Dutch Jews and Eighteenth-Century Trade* (Leicester: Leicester University Press), 102–9.

[25] My thanks to Professor Patrick Wallis at the London School of Economics for sharing his data from the Port of London rate books.

[26] Scotland. 1657. *A Book of Values of Merchandize Imported. According to Which, Excise Is to Be Paid by the First Buyer* (Edinburgh: Christopher Higgins), 22, 33.

[27] Harvey, Gideon. 1678. *The Family Physician and House-Apothecary* (London: M.R), 131; Culpeper, Nicholas. 1651. *A Physical Directory, Or, A Translation of the Dispensatory Made by the Colledg of Physitians of London and by Them Imposed upon All the Apothecaries of England to Make Up Their Medicines By: And in This Third Edition is Added a Key to Galen's Method of Physick*. 3rd ed. (London: Peter Cole), 52.

[28] Harris, Nichola E. 2009. *The Idea of Lapidary Medicine: Its Circulation and Practical Applications in Medieval and Early Modern England 1000–1750*. Unpublished thesis submitted for the degree of Doctor of Philosophy, The State University of New Jersey, 205–9; Harris, "The Protection of Innocents", 287–8.

in a society which valued thrift in terms of both practical and moral economy.[29]

13.3 Coral in the Galenic Corpus

Pharmacopoeia Londinensis was designed to safeguard the expertise of licensed physicians to the point that the knowledge they held about simples such as the therapeutic uses of coral and its application was deliberately obscured. A way of elucidating this information is to consider what they read. English physicians studied philosophy and medicine in Latin and Greek at Oxford and Cambridge, and many travelled to Europe to achieve their medical degree. While we know they were expected to be thoroughly versed in Galenic teaching, it is difficult to ascertain exactly which Galenic texts they studied, though *De Simplicium Medicamentorum Temperamentis et Facultatibus* was likely a core text at universities in Montpellier, Paris and Bologna in the Middle Ages.[30] Pseudo-Galenic texts such as the *Alphabet of Galen* also formed part of the accepted curriculum.[31] In this section, we will examine several texts circulating in Europe in the Middle Ages which connected Galen and coral and give us an indication of transmission and circulation, including the *Alphabet of Galen*, the *Alphabetic Lapidary* by twelfth-century poet Phillippe de Thaon and *Liber de Gradibus* by Constantinus Africanus (d. before 1098/9). Recurring themes suggest the basic knowledge about coral expected by the College of Physicians. I propose that the application of coral as a Galenic simple within *Pharmacopoeia Londinensis* can be interpreted by reference to Galenic texts on pharmaceutical action such as the *Method of Medicine*. Taken together as a corpus, writings ascribed to Galen which discuss drugs and modes of action may shed light on how English physicians perceived the properties and pharmaceutical action of Galenic simples such as coral.[32]

Coral was listed in *The Alphabet of Galen* manuscript, a simple alphabetical pharmacopoeia listing 300 *materia medica*, which circulated in

[29] Werrett, Simon. 2019. *Thrifty Science: Making the Most of Materials in the History of Experiment*. (Chicago: The University of Chicago Press), 36-8.

[30] McVaugh, "Galen in the Medieval Universities".

[31] Everett, *The Alphabet of Galen*, 26.

[32] An exhaustive study of the presence of coral within the Galenic corpus is outside the scope of this study and presents an opportunity for further research.

the eleventh century as a useful guide for students at European universities and was widely believed to be an authentic Galenic text. Nicholas Everett suggests that the manuscript draws on pre-Galenic Greek tenets of pharmacology rather than the 'elaborate theorising on drug properties' typical of Galen and was likely mistakenly collated with his works.[33] Coral was described as follows: 'Coral is red in colour, like a lobster. It has styptic properties, hence it is wonderful for healing those spitting blood'.[34] Everett notes that this reflects the description of coral by Dioscorides and Pliny the Elder but 'no other sources compare its colour to lobster'.[35] In this entry, coral can prevent blood loss but the mode of action to curb bleeding is not described. However, the red quality of the coral emphasised here may relate to the doctrine of signatures, in which like treats like, as red coral staunches red blood.[36] In *Opera Omnia* of the Latin Galen, published by the House of Giunta in Venice, the 1565 edition included *Alphabet of Galen* manuscripts and asserted coral's red quality like lobster and its styptic properties in the sixteenth century: '*Corallus est colore rubro, quasi arbustum. Vires aut[em] habet stypticas: unde sanguinem excreantibus mire p[er]ficit*'.[37]

While coral appears in a variety of medieval lapidaries and compendia, the medicinal properties of coral were particularly attributed to Galen by Constantinus Africanus and Phillippe de Thaon, as noted by Harris and Barroso respectively.[38] Constantinus Africanus, a physician practising in North Africa in the eleventh century, brought several Galenic texts in Arabic to Italy and shared his translations with the Salerno medical school. While his work is known to present a key component in the transmission of Galenic texts to the Latinate West, this is reflected in his inclusion of red coral as a Galenic simple.[39] The receipt for 'de fluxu sanguinis

[33] Everett, *The Alphabet of Galen*, 7, 33–4.

[34] Everett, *The Alphabet of Galen*, 211.

[35] *Ibid*.

[36] Dioscorides, *De materia medica*, 389–90.

[37] [Galen]. 1565. *De simplicibus medicaminibus ad Paternianum*. In *Galeni omnia quae extant opera*. Vol. 10 (Venice: Giunta), "De corallo", 83r.

[38] Harris, "The Protection of Innocents", 272; Barroso, "Coral in Petrus Hispanus", 269–271.

[39] For the significance of Constantinus Africanus' translations of Galen, see Durling, "A Chronological Census", 234; Green, Monica. 2019. "Gloriosissimus Galienus: Galen and Galenic Writings in the Eleventh- and Twelfth-Century Latin West." In *Brill's*

de epate' in *Liber de gradibus* demonstrates the familiar combination of red coral with healing earth (in this case Sigillan rather than Lemnian), pomegranate flower, dragon's blood and hypocistidos and emphasises the value of its styptic properties.

The twelfth-century Norman *Alphabetic Lapidary* attributed to Phillipe de Thaon, a French monk, included two poems on coral, the rhyming couplets below highlighting the medical uses of coral according to Galen.[40]

> E, issi cum dit Galienus,
> Iceste pere corallus
> Garist des oilz tote dolur
> E si chace la tenebrur.
> E si hom ad la dent dolur,
> Par ceste pere avrat valur;
> E se il ad les denz purries
> U se eles sunt enruissies,
> Quele qu'il ait enfermete,
> Par ceste pere avra sante.[41]

These include references to coral's ability to treat painful, broken teeth and help sore eyes and blindness. The poem also refers to drinking coral to staunch uterine bleeding—'Et femme qui ceste bevra, *De fluxu sanguinis* guarra'—and if placed on a man's wound, no drop of blood would be lost. Certain folios of twelfth-century English manuscript *Digby 13* (currently held in the Bodleian Libraries, Oxford but previously by Christ Church, Canterbury) bear a close relation to the *Alphabetical Lapidary,*

Companion to the Reception of Galen, edited by Petros Bouras-Vallianatos and Barbara Zipser (Leiden: Brill), 324–336; Long, Brian. 2019. "Arabic-Latin Translations: Transmission and Transformation." In *Brill's Companion to the Reception of Galen*, edited by Petros Bouras-Vallianatos and Barbara Zipser (Leiden: Brill), 344–348. For a discussion of red coral in the works of Constantinus Africanus, see Harris, "The Protection of Innocents", 272–274.

[40] Studer, Paul, and Joan Evans. 1924. *Anglo-Norman Lapidaries* (Paris: Champion), 216–7, 223–4.

[41] This section of the poem may be approximately translated as follows 'And as Galen says, this stone coral heals the eyes from all pain and removes any blindness from them. And if a man has dental pain, by this stone he will have benefit; and if he has rotten teeth or if they are loose. When he has infirmity, by this stone he will have health.' My thanks to Segolene Gence at the University of Kent for her assistance with the medieval French.

and were likely copied from an earlier version of it.[42] This includes the second section on coral, which reads '*Corallus, ut dicit Galienus, valet ad omnem dolorem oculorum et caliginem et dentium dolorem*', referring to painful eyes and teeth, and its uses to staunch '*fluxum sanguinis*'.[43] This would provide evidence of a route of transmission from the continent to England, directly linking coral and Galen.

Constantinus' translations distributed within European universities and De Thaon's lapidary circulating within the Anglo-Norman world specifically attributed coral's reported medicinal benefits to Galen and follow similar patterns of medical properties. Together with the *Alphabet of Galen*, the selected texts examined here illustrate that manuscripts attributed to Galen or specific remedies, including the phrase 'so says Galen' present a coherent body of medical lore regarding coral's usage for treating specific ailments within learned medicine.[44]

To assess how learned physicians educated in the works of Galen, Dioscorides and Hippocrates would have understood the *pharmaceutical action* and *administration* of a Galenic simple, we can examine some texts which may have informed their practice including Galen's *De methodo medendi* and Dioscorides' *De materia medica*.[45] Dioscorides referred to the colour and texture of coral being an indicator of quality, with red, smooth coral being preferable. Regarding pharmaceutical action, he described coral as binding and cooling which, according to Hippocratic humoral theory or in terms of 'capacities' (δυνάμεις), as Dioscorides preferred, would make it particularly suitable to treat hot, loose conditions.[46] It also helped regulate flow of bodily fluids, such as blood and urine, and healed wounds. Significantly, Dioscorides referred to coral as acting 'gently', a quality which influenced for whom coral would be a suitable treatment. Coral as a gentle, binding, cooling and astringent

[42] Studer and Evans, *Anglo-Norman Lapidaries*, 201.

[43] MS Digby 13, f. 7 cited in Studer and Evans, *Anglo-Norman Lapidaries*, 366.

[44] Arabic authors, Avicenna, Al-Biruni and Al-Tifasi include the medical benefits of coral but these texts collate materials from a range of Arabic, Greek, Roman, Syriac, and Indian traditions. See Barroso, "Coral in Petrus Hispanus," 270–1.

[45] Galen. 2011. *Method of Medicine*, translated and edited by Ian Johnston and G. H. R. Horsley, Vol 1–4 (Cambridge MA: Harvard University Press); Dioscorides, *De Materia Medica*.

[46] Riddle, *Dioscorides on Pharmacy*, xiv.

medicine fits neatly within Galen's broader conceptualisation of pharmaceutical action regarding quality and intensity of drugs, evident in texts such as in *De methodo medendi* and *De temperamentis*.[47] Dioscorides is also associated with the doctrine of signatures (*signatura rerum*).[48] In the case of red coral, the quality of the redness possibly associated it with treating blood disorders. As we will see in the receipts to follow, red coral was also listed with other ingredients typically red in colour such as Lemnian earth and pomegranate flowers to limit bleeding.[49]

In *De compositione medicamentorum secundum locus*, red coral was recommended for the treatment of uterine haemorrhage and spitting up blood.[50] These remedies can be cross-referenced to Galen's *De methodo medendi* to explain mode of action and means of application. The remedy for uterine haemorrhage includes coral and pomegranate flower.[51] Discussing uterine haemorrhage in *De Methodo Medendi,* Galen recommended cupping on the chest to draw blood upwards and administering a cold and astringent medicine 'into the uterus via a *metrenchytos*' *(syringe)*.[52] *Pastillus ex corallio* were recommended for coughing up blood.[53] The recipe includes coral, Samian earth, pomegranate flower, Lemnian earth, white starch and white hypocystis. In *De methodo medendi*, Galen recommended treating haemoptysis by bleeding the patient (to draw blood downwards), rubbing and bandaging all limbs and giving warm *oxykraton* (vinegar and milk) to drink. 'After this, give one of the medications that is emplastic and at the same time astringent'.[54] Coral pastilles, as a cool and binding medicine, could treat lung conditions where the blood was warm and hot.

[47] Galen, *Method of Medicine*; Galen. 2019. *Works on Human Nature. Volume 1, Mixtures (De Temperamentis),* translated and edited by Peter N. Singer and Philip J. van der Eijk. (Cambridge: Cambridge University Press).

[48] See example of Scorpionwort resembling scorpion tails to treat scorpion stings in Dioscorides, *De materia medica*, 329.

[49] For a discussion of Lemnian earth see Nutton, *From Democedes to Harvey*, IX, 144.

[50] Galen, *De compositione medicamentorum secundum locus*, 78, 86–7, 295.

[51] Galen, *De compositione medicamentorum secundum locus*, 295.

[52] Galen, *Method of Medicine,* Bk 3:17, Bk 5:35.

[53] Galen, *De compositione medicamentorum secundum locus*, 86–7.

[54] Galen, *Method of Medicine*, Bk 8: 55.

From the combination of ingredients in these receipts, we can deduce how coral was being used and its perceived intensity of action. Galen noted in *De methodo medendi* that in cases of haemorrhage 'from the depths', that is not surface wounds, we must consider the amount of bleeding as an indicator of treatment and assess the whole condition.[55] In these receipts for blood loss from the uterus and lungs, cooling, emplastic, and astringent ingredients such as coral, Lemnian earth and pomegranate flower were employed. Galen viewed the flower of pomegranate as a stronger astringent medication, while Lemnian earth was a gentler medicine used to treat more minor bleeding.[56] The presence of pomegranate flower in the receipt for uterine haemorrhage suggests a stronger medication for heavier bleeding. Lemnian earth in the second receipt for haemoptysis indicates a gentler medicine. The presence of coral in both a strong and gentle medicine suggests that coral was gentle and enhanced the properties of the compound.

In Book 2 of *De remediis parabilibus*, thought by some to be part of the pseudo-Galenic corpus but possibly available to early modern scholars in Greek, coral was recommended to treat teeth which have been damaged by a blow to the mouth, and to whiten stained teeth.[57] In the first example, coral was applied to staunch bleeding from the gum where the teeth were knocked out of place or possibly knocked out completely. Alternatively, it was employed to soothe the teeth and help them settle back into position. In the second example, coral was combined with pumice, cuttlefish bones and date stones to whiten and purify unsightly teeth. In this case, the smooth, hard texture of coral was important.

13.4 Coral as a Galenic Simple in Seventeenth-Century England

From the texts discussed above, common themes regarding red coral's properties emerge, repeated and shared between authors and establishing it as a standard simple within the Galenic tradition. For members of the College of Physicians in England, red coral's styptic action, related

[55] Galen, *Method of Medicine*, Bk 5: 37.

[56] *Ibid*.

[57] Galen, *De remediis parabilibus*, 430, 432.

to its binding and astringent properties, would have been well established, the red colour a direct reminder of its sympathetic effects.[58] In the coral troche receipt in *Pharmacopoeia Londinensis,* coral was listed alongside the same ingredients found in Galen's *De compositione medicamentorum secundum locus* and *De methodo medendi,* such as Lemnian earth and flower of pomegranate, and it would be a logical assumption that this troche receipt was taken directly from Galenic texts with the same intended purposes.

Attempts by the College of Physicians to restrict medical knowledge about Galenic receipts were thwarted by Nicholas Culpeper's translation and expansion of *Pharmacopoeia Londinensis* (1618). He published *A Physicall Directory* (1649) at the height of civil unrest in England and amid demands to topple the old hierarchical structures.[59] He introduced the lay reader not only to the medical receipts of the pharmacopoeia but also to their medicinal uses and the Galenic theory behind their applications. He added an appendix 'A Key to Galen's Method of Physick' to the 3rd edition of *A Physicall Directory* in 1651 and published *Galen's Art of Physick* in 1652.

Culpeper translated the pharmacopoeia's coral lozenge receipt in *A Physicall Directory* and gave indications for its usage.

> *Trochisci Diacorrallion. Galen.*
> Take of Bole Armenick, red Corral of each an ounce, Balaustins, terra Lemnia, white Starch, of each half an ounce, Hypocystis, the seeds of Henbane, Opium of each two drachms, juyce of Plantane so much as is sufficient to make them into troches according to art. *A. These also stop*

[58] While I have not found further reference to coral as a specifically Galenic dental medicine in seventeenth century texts, coral was commonly used for children's teethers (see Richards, Francesca E. 2024. "I Praie Ye Send for the Courall: Children's Coral as the Physical Embodiment of Parental Hopes and Fears in Early Modern England." *The History of the Family* 30 no. 1: 19–43 and Harris, "The Protection of Innocents," 282–3). It was also used in adult tooth powders in early modern England as mentioned later in this chapter.

[59] Curry, Patrick. 2004. "Culpeper, Nicholas (1616–1654), Physician and Astrologer." *Oxford Dictionary of National Biography*. https://doi.org/10.1093/ref:odnb/6882 [last accessed 24 February 2025].

> *blood, help the bloody flux, stop the terms, and are a great help to such whose stomach loaths their victuals.*[60]

Culpeper gave further information about the uses of coral in the section entitled 'Belonging to the Sea'.

> Red Corrall, is cold, dry and binding, stops the immoderate flowing of the terms, bloody-fluxes, the running of the reins, and the whites in women, helps such as spit and pisse blood…it is an approved remedy for the falling sickness. Also if ten grains of red Corral be given to a Child in a little breast-milk so soon as it is born, before it take any other food, it will never have the falling sickness, nor convulsions. The common dose is from ten grains to thirty.… The red Corral preserve the body in health, and resist feavers. The Dose is ten grains or fewer; more I suppose because it is dear, than because it would do harm.[61]

Culpeper stated that coral can 'preserve the body in health' so has general health-giving properties, in addition to being suitable to treat specific conditions relating to excessive flow of bodily fluids, blood disorders, epilepsy, convulsions, and fevers. He particularly mentioned coral as appropriate for women and children.[62] Some of these uses can be traced back to Galen and Dioscorides.

Culpeper interpreted coral's properties within his own understanding of Galenic pharmacology, particularly in terms of intensity of specific drugs. While other drugs had similar properties, coral as a first-choice medicine related to its *intensity* of action. If we cross-reference to Culpeper's *A Key to Galen's Method of Physick*, particularly on active qualities of coldness and dryness, coral's gentle action made it particularly suitable for newborns and women.

[60] Culpeper, Nicholas. 1649. *A Physicall Directory, Or, A Translation of the London Dispensatory Made by the Colledge of Physicians in London*. 1st ed. (London: Peter Cole), 253.

[61] Culpeper, Nicholas. 1651. *A Physical Directory, Or, A Translation of the Dispensatory Made by the Colledg of Physitians of London and by Them Imposed upon All the Apothecaries of England to Make Up Their Medicines By: And in This Third Edition is Added a Key to Galen's Method of Physick*. 3rd ed. (London: Peter Cole), 35.

[62] For further scholarship on the use of coral to preserve the health of women and children, see Richards, "'I Praie Ye Send for the Courall'" and Harris, "The Protection of Innocents".

In Culpeper's discussion of cold medicines, these medicines were required to counteract 'unnatural heat', arising from 'food', 'the bowels', or 'fevers'. Cooling drugs, which had a high intensity, were potentially dangerous.[63] Gently cooling medicines were required for children and those with weak digestion, that is, medicines cooling in the first degree. The gently cooling nature of coral made it uniquely suitable for newborns and Culpeper deemed coral to be so important for newborns as a prophylactic that it must be given before 'any other food'. Why might an infant need a gentle cooling medicine such as coral immediately after birth? Culpeper gave two essential reasons in *Galen's Art of Physic:* the father's seed and the mother's blood from which the child was formed were 'hot and moist' and the mother's womb where the child grew was also 'hot and moist'.[64] The newborn was thus intrinsically vulnerable to overheating due to their hot constitution. Because coral was deemed gently cooling, it rebalanced the infant without threatening their naturally warm state. Culpeper also noted that 'A Child's Body or any part thereof may be too hot, by reason of sucking a Chollerick Woman'.[65] Coral offered a means to cool the heat of breastmilk to allow the weak stomach of the newborn to adequately digest it.

Coral as a dry, binding medicine halted unhealthy flow of bodily fluids such as haemorrhage and diarrhoea and dried out phlegmatic and moist conditions. Drying medicines 'consume moisture, stop fluxes, and make such parts dry as are slippery, they make the body and members firm, when they are weakened by too much moisture, that so they may perform their proper functions'.[66] Culpeper was clear to avoid over-drying and referred to Galen's concept of radical moisture, the essential moisture of the human body which must not be dried out, citing 'De Simpl Med Facult lib 5'.[67] Given that coral was viewed as a gentle medicine, a suitable option for children and people with a weaker constitution, it is likely that its intensity was also considered dry in the first degree.

Coral's drying properties could be beneficial to women's health conditions, and Culpeper noted the use of coral to stop excessive uterine

[63] Culpeper, *A Physical Directory,* 3rd ed, 144.

[64] Culpeper, Nicholas. 1652. *Galen's Art of Physick* (London: Peter Cole), 43.

[65] Culpeper. *Galen's Art of Physick*, 10.

[66] Culpeper. *A Physical Directory*, 3rd ed, 145.

[67] *Ibid.*

blood flow. Galen would inject astringent medicines into the womb and then use revulsion techniques. In *A Directory for Midwives* (1655), Culpeper recommended a coral syrup or electuary, in utero astringents and to open a vein in the Arm and let blood by degrees, thus using a similar combination of treatments as Galen.[68] Similarly, in treating uterine haemorrhage in *The Sicke Womans Private Looking-glasse* (1636), Norwich physician John Sadler recommended coral lozenges and states that '*Galen* by conveighing [medicine] through a metrenchita into the wombe 4 days cured this immoderate flux which by no other wayes else bee restrained'.[69]

In *A Compleat Practice of Physick* (1656), Galenic physician John Smith wrote that miscarriage could be caused by 'slipperiness of the matrix from a phlegmatick humour'.[70] Following the need to balance the humours, internal and topical remedies must be drying and astringent. Smith listed coral as a primary simple with these properties and recommended a remedy with red coral, pearl, ivory, and masticke to prevent spontaneous abortion. This medicine thus counteracted 'slipperiness' of the womb by its drying action, reflecting the Galenic emphasis on limiting excessive moisture. The medicine was not aimed at preventing the symptom of blood loss but attending to the root cause of the miscarriage: slipperiness of the womb caused by the imbalance of phlegm. Smith may have chosen particularly gentle ingredients such as coral because women were considered the weaker sex and might be weakened further by a miscarriage.

In contrast to the authors of *Pharmacopoeia Londinensis*, Culpeper, Sadler and Smith situated coral within a broader understanding of Galenic theory in terms of the humours, drug action and appropriate administration. Coral was presented as "cold, dry and binding" in the first degree, gentle enough for the weakest patient. Culpeper clearly communicated acquired knowledge about coral's benefits, transmitting information to the wider population in the vernacular and effectively undermining the prescribing role of physicians.

[68] Culpeper, Nicholas. 1655. *A Directory for Midwives: Or a Guide for Women, in Their Conception, Bearing, and Suckling Their Children* (London: Peter Cole), 269.

[69] Sadler, John. 1636. *The Sicke Vvomans Private Looking-Glasse Wherein Methodically Are Handled All Uterine Affects, Or Diseases Arising from the Wombe* (London: Philemon Stephens & Christopher Meridith), 40–41.

[70] Smith, John. 1656. *A Compleat Practice of Physick.* (London: Simon Miller), 1–2.

Another contemporary writer offers insights into how coral was perceived as beneficial or unnecessary to certain treatments. James Primrose was a physician practising in Hull and a prolific writer of pro-Galenist texts. His treatise in Latin entitled *De Vulgi in Medicina Erroribus* (1638) was translated into *Popular Errours* (1651). Primrose's references to coral reveal two interesting elements regarding Galenic pharmacology. In Primrose's section on worms, a potentially fatal parasitic infection, Primrose railed against empirics who 'indiscreetly administered' remedies.[71] He wrote that it is important to diagnose appropriately symptoms which accompany worms. In the case of a malignant fever, he recommended an appropriate cordial such as coral. The patient's individual symptoms must be considered, rather than the singular disease, and treated accordingly. In this situation, Primrose was adopting the Galenic approach; treating the individual through bespoke treatments, rather than a medicine targeted towards a specific illness.

However, Primrose took a different view from Galen on the matter of compound medicines. In the section on Galen's attitudes to narcotics, that they should be dry and binding, Primrose was firm that extra *materia medica* such as coral should not be added when making laudanum, as 'such unprofitable things, which adde to the price, not to the vertue of it'.[72] In this case, red coral had appropriate qualities needed to balance the humours but Primrose argued that duplicating drugs with the same role was unnecessary and financially motivated. Galen viewed adding extra ingredients to increase the price of a compound medicine essential to make it desirable to wealthy clients, who would treat a cheap medicine with suspicion.[73] Primrose may have modified Galen's view based on a Protestant emphasis on thrift, in which expensive medicines had to be justified.[74]

[71] Primrose, James. 1651. *Popular Errours. Or the Errours of the People in Physick*, translated by Robert Wittie. (London: Nicholas Bourne), 383.

[72] Primrose, *Popular Errours*, 393.

[73] Nutton, Vivian, 2016. "Folk Medicine in the Galenic Corpus". In *Popular Medicine in Graeco-Roman Antiquity: Explorations*, edited by William V. Harris. (Leiden: Brill), 272–279, 275.

[74] Werrett, *Thrifty Science*, 36–8.

13.5 Coral and Chemical Medicine

While coral was familiar within the pharmacopoeia as a Galenic simple, coral was also perceived as an important medicine within the works of chemical physicians. The 'father' of chemical medicine, the wandering Swiss physician known as Paracelsus (1493–1541), advocated the medicinal use of coral in his *Herbarius (c.*1520s). Indeed, while Paracelsus was famously critical of Galenic medicine, we see overlaps in how he interpreted 'The Power of Corals' in his work although he attributed its action to a divine form of healing. He referred to coral's ability to 'regulate' bodily fluids including menstrual blood, stomach fluids and 'red and white dysentery' and staunch bleeding from the nose, wounds and 'the golden vein' (a euphemism for haemorrhoids).[75] Paracelsus recognised coral's styptic properties and noted it to be a gentle medicine, suitable for the 'young and old'.

The works of iatrochemists indicate coral continued to be viewed as curative for similar conditions and beneficial to the balance of the body, although the mode of pharmaceutical action was explained by other means, such as fermentation or the balancing of acids and alkalis.[76] Rather than an individualised treatment regime according to original Galenic principles, iatrochemists focused on producing universal cures proved by experiment. Thomas Willis, leader of the English chemists, recommended coral in various remedies but his explanation for coral's relevance to treating epilepsy is particularly illuminating. Willis described the cause of epilepsy 'to consist in the heterogeneous Copula, joyning or cleaving to the spirits, inhabiting the Brain, and inciting them to praeternatural explosions'.[77] Coral, belonging to the animal and mineral cures, acted to 'purifie the animal spirits, to fix them, and to strengthen them'.[78] Already

[75] Cited in Moran, Bruce T. 1993. "The 'Herbarius' of Paracelsus." *Pharmacy in History* 35, no. 3, 122.

[76] Clericuzio, Antonio. 1993. "From van Helmont to Boyle. A Study of the Transmission of Helmontian Chemical and Medical Theories in Seventeenth-Century England." *The British Journal for the History of Science* 26, no. 3, 303–334; Moran, Bruce T. 1996. "A Survey of Chemical Medicine in the 17th Century: Spanning Court, Classroom, and Cultures." *Pharmacy in History* 38, no. 3: 121.

[77] Willis, Thomas. 1681. *An Essay of the Pathology of the Brain and Nervous Stock in Which Convulsive Diseases Are Treated Of.* (London: T. Dring), 16.

[78] Willis, *An Essay,* 20.

a traditional cure for epilepsy or 'falling sickness', here coral's pharmaceutical action was understood within iatrochemical terms, that is calming the vital spirits, rather than as a binding, astringent Galenic simple.[79] Coral could be employed to treat the internal cause of the epilepsy, but Willis remarked 'this kinde of distemper (as *Galen* hath noted) proceeds either from the external, or internal parts'.[80] Rather than vilifying Galen, Willis drew on his principles and re-worked them.

Coral was thus trusted within Galenic, Paracelsian and chemical medicine yet elite physicians of opposing doctrinal persuasions showed concern that these old favourites would be dismissed with innovation in the medical world. Lazare Rivière (1589–1655), a chemical physician and professor at Montpellier whose *The Practice of Physick* was translated into English in 1655, asserted the value of coral and other gems.

> The Innovators of this Age, who endeavor to banish Gemms, Pearls, Coral, and al Cordial things from the use of Physick; and cure all Feavers, even those that are malignant, with Blood-letting and meer refrigerating Apozemes; may be convinced with this one Experiment, at least touching Coral and Pearls: which being poudred, if they be infused in Vinegar, Juyce of Lemmons, Spirit of Vitriol, or Aquafortis; they take away all the Acrimony of those Liquors.[81]

Walter Harris, royal physician to William and Mary and an advocate of 'natural remedies' in *Pharmacologia Anti-Empirica* (1683), argued that natural alkalis such as coral were still valuable medicines in contrast to artificial chemical medicines and should be used in greater quantities.

> *Corall,* &c. are *Alkalis* which deserve not to be neglected or forgotten; and if we would sometimes mend, or fortifie our hand, by giving a *Drahm* at a time, instead of a *Scruple,* or a few *Grains,* I dare be bold to say, we should find the less need of *Alkali Artificial Salts.* And this may be a Rule of good use, not to be too Timorous in the use of Safe, Innocent, and

[79] *Ibid.*

[80] Willis, *An Essay,* 16.

[81] Riverius, Lazarus. 1655. *The Practice of Physick,* translated by Nicholas Culpeper, Abdiah Cole, and William Rowland. (London: Peter Cole), 630.

> Natural Remedies, as we cannot easily be Timorous enough in the use of Dangerous, Uncertain, or Great Artificial Preparations.[82]

In fact, fears that coral and other similar materials would be 'neglected or forgotten' were not well-founded or were perhaps overstated to cast aspersions on opposing theoretical positions.

13.6 Practising Physicians and Universal Medicine

How did physicians with more prosaic interests view coral? Some physicians combined Galenic and chemical principles in their practice, drawing on multiple doctrines rather than taking entrenched positions. This section argues that physicians developed the ideas of iatrochemists to transform coral from a Galenic simple to a material that could be explained through an alternative mode of action from humoral theory, which relied on treating the individual constitution. Coral presented the perfect universal medicine because it offered a form of well-known gentle medicine, already well accepted by the populace. Theophilus Garencières, Richard Browne and John Pechey, physicians working in London in the late seventeenth century, sought to address the ills affecting their patients—infectious diseases and high infant mortality. Garencières and Browne wrote treatises on coral expounding its benefits but both were starting to question Galenic theories of pharmacology.

Garencières, a French born doctor who practised in England for most of his life, turned against Galenic medicine because he believed Galenic practices of phlebotomy, blister plasters and purging weakened the body; he preferred pure strengthening medicines with wide applicability.[83] In *The Admirable Virtues, and Wonderful Effects of the True and Genuine Tincture of Coral, in Physick* (1676), he advocated using coral in its most essential form to treat a variety of conditions including pox, plague, gout and bleeding disorders and he gave very specific instructions regarding

[82] Harris, Walter. 1683. *Pharmacologia Anti-Empirica; Or, a Rational Discourse of Remedies both Chymical and Galenical.* (London: Richard Chiswell), 86.

[83] Garencières, *The Admirable Virtues*, 42.

the 'chymical art' of obtaining coral tincture and salt of coral, criticising those who made it improperly.[84]

While not directly crediting Jan Baptista van Helmont (1577–1644) as a source, Garencières used Helmontian terms with reference to the 'archaeus' of coral and the 'vital spirits' of the body.[85] He wrote that coral acted by 'actinobolism', radiating its curative powers like rays of sun, created by God.[86] These 'Beams of Light' are reminiscent of van Helmont's light theory. Van Helmont referred to God as the'Father of Lights' and argued that medicines 'unfold or expose the direct Beam of their own Faculties, and their endowed Virtue, and to which end they were ordained of God'.[87]

Garencières wrote that each hidden part of the body had its illnesses and God provided remedies, the beams of light providing access where herbs and plants could not reach.

> The Remedies having spred the Beams of their Virtues, go directly to that Member which is analogal and correspondent with them, and strengthen and comfort it. Thus all Cordials by their Actinobolism, do not meddle with the Liver, Brains, or Spleen; but with the Heart.[88]

Coral in its purest form would be able to target specific areas of the body to calm the spirits and restore the scattered humours to achieve 'perfect *crasis*'.

While stating the importance of coral's action in mystical and chemical terms, Galenic medicine retained a foothold in Garencières' work. Garencières continued to refer to the Ancients as a means of authority, including a reference to coral in 'Theophrastus' book' and Dioscorides and Galen as a source of information on fevers, 'As *Galen* saith, *Nemo sine febre moritur*' (no one dies without a fever).[89] Garencières recommended

[84] Garencières, *The Admirable Virtues*, 18–21.

[85] Garencières, *The Admirable Virtues,* 4. Regarding the influence of van Helmont in England, see Clericuzio, "From van Helmont to Boyle".

[86] Garencières, *The Admirable Virtues,* 33.

[87] Helmont, Jan Baptista van. 1644. *Van Helmont's Works Containing His Most Excellent Philosophy, Physick, Chirurgery, Anatomy*, translated by J.C. (London: Ludowick Hoyd), Preface, 577.

[88] Garencières. *The Admirable Virtues,* 33.

[89] Garencières. *The Admirable Virtues*, 8, 67.

coral tincture to treat the same conditions a Galenic physician would, including bloody fluxes, convulsions, and painful eyes. However, he made it more generally applicable to all pestilential fevers and contagious diseases including the plague and smallpox. Garencières also advocated compound medicines, seen as corrupt and impure by other chemists.[90] His explanation of coral's action in terms of 'actinobolism' (referred to as a type of 'irradiation') allowed for its use in compound medicines, as components of compound remedies acted as individual beams of light to target specific bodily organs.[91]

Richard Browne published *Coral and Steel* in 1699, arguing that coral had multiple therapeutic uses, particularly for children under the age of seven years old. In his view, coral could,

> Stay the bleeding at Nose, or else-where; stop, with much safety, all manner of Fluxes: asswage pain; provoke Urine; … strengthen the Spirits; allay vapours; exhilarate the minde; procure an Appetite; help Digestion; open the Pores, and produce an insensible transpiration; clear the skin, and make the Countenance lively.[92]

Browne recommended coral specifically for children under seven as a general strengthener and preserver of health and recommended giving children magistery of coral or coral syrup.[93] This follows the concept of coral as 'gentle', interpreted by Culpeper as suitable for the very young according to their delicate constitutions.

However, Browne developed his own concept of coral's pharmaceutical action and means to test it. In *Coral and Steel,* he refers to the notion of *crasis* in terms of balancing bodily 'mixtures' but adopts an approach more in line with iatrochemistry. Browne argued that coral transformed heterogeneous blood to homogenous blood through a process of fermentation, thus preventing blockages and uncontrolled flows and allowing the

[90] Wear. *Knowledge and Practice*, 95.

[91] Garencières. *The Admirable Virtues*, 33.

[92] Browne, *Coral and Steel*, 36–7.

[93] Magistery of coral was made by beating small branches of red coral to a fine powder, then dissolving it in acid and filtering it to produce a white precipitate. See Thibaut, Pierre. 1675. *The Art of Chymistry as It Is Now Practiced*, translated by a Fellow of the Royal Society. (London: John Starkey), 174–5.

body to reach a stable and balanced condition.[94] Browne noted that only a little fermenting was required to stimulate the liver and spleen to take on their natural roles.[95]

Browne believed that young children suffered from distempers caused by 'imperfect fermentation'; 'Coral ferments' and so removed the cause.[96] While Browne asserted that he was familiar with coral's properties through experience, he argued that he could prove coral's benefits for the young who have 'contracted some general distemper' by rational *experiment*, for which he gave detailed instructions:

> I say, give unto ten such Children twice every day, for six or seven dayes together, of this Red Coral.. and you shall observe… that scarce one [of] these ten shall continue, to the space of those six or seven dayes, unrestored unto its perfect health.
>
> After that, make choice of ten more Cachectically distempered children, but give the Coral onely to five; and then after a few dayes you shall observe the difference, and it no small difference, between those unto whom you gave the Coral, and the other. I appeal with such confidence unto any man's experience, because I know it already my own experience.[97]

This conceptualisation of red coral as a universal tonic for children under seven matched interest in providing accessible medicine for the poor, rather than involving costly personal consultations typical of Galenic medicine.[98] However, while Browne employed an alternative to humoral theory to explain and test coral's benefits, the treatment of regular doses of coral syrup was essentially identical to a Galenic treatment.

Browne worked closely with prolific writer and physician John Pechey from premises at the Golden Angel and Crown on King's Street London and both these physicians were concerned with treating the less well off in

[94] Browne. *Coral and Steel*, 40.

[95] *Ibid*.

[96] Browne. *Coral and Steel*, 45.

[97] Browne. *Coral and Steel*, 44–5.

[98] Wear. *Knowledge and Practice*, 21.

society, offering advice to the poor for free.[99] They both recommended red coral as a medicine, though Browne was more effervescent about its benefits and they explained coral's action in different ways. Considering Browne and Pechey illustrates how colleagues working closely together, treating similar patients, were drawing on different doctrines to explain the pharmaceutical action of a single drug while maintaining some links with Galenic practice.

Unlike Browne, Pechey interpreted coral both as a Galenic simple with traditional Galenic qualities and within the framework of acids and alkalis. Throughout *A Plain Introduction to the Art of Physic* (1697), Pechey refers to Galen as an authority on simples, bloodletting and purging. He lists *materia medica* at the end of the book according to Galenic qualities, and refers to 'Coral white, red—cold, dry astringent—cardiac'.[100] Pechey lists coral in a dentifrice also containing cuttlebone and a receipt for sealed earth troches which includes familiar ingredients from the *Pharmacopoiea Londinensis* Galenic receipt: coral, bole armeniac, pomegranate flowers and hypocistis, stating 'they are cool, dry, are astringent, good for spitting of blood all haemorrhages and great fluxes of the courses'.[101] However, he also recommends chemical medicines such as salt and tincture of coral and in describing the pharmaceutical action of coral, describes how saline cordials 'destroy the predominancies of an acid… either in the Bowels or in the Mass of Blood, and correct the Enormities produced thereby'.[102] This produced benefits such as the stopping of diarrhoea or the 'evacuation of urine'. Pechey thus understood coral's action to staunch bodily fluids both as an astringent medication in the Galenic tradition and as a buffer against excessive acid. Pechey assertively avoided restricting himself to a single medical doctrine, recommending 'choice Medicines both chymical and galenical'.[103]

[99] Cook, Harold J. 2004. "Browne, Richard (1647/8–1693/4?), Physician." Oxford Dictionary of National Biography. https://doi.org/10.1093/ref:odnb/3694 [last accessed 24 February 2025].

[100] Pechey, John. 1697. *A Plain Introduction to the Art of Physic* (London: Henry Bonwicke), 278.

[101] Pechey. *A Plain Introduction*, 322, 330.

[102] *Ibid*., 157.

[103] *Ibid*., title page.

Enthusiasm for coral, demonstrated by Garencières, Browne and to some extent Pechey, may reveal attempts to reconcile their own interests and beliefs with the demands of their patients. These doctors were embracing new ideas about pharmaceutical action and were increasingly interested in providing universal medicines which would be accessible to the poor and treat the multitude of dangerous and contagious afflictions circulating in London during this period. By recommending coral to treat multiple conditions, coral could be re-branded as a more cost-effective or 'thrifty' medicine, attractive to the middling sorts as well as the poor, in line with Protestant notions of moral economy and household management.

However, these examples from Garencières, Browne, and Pechey suggest that while they presented coral's benefits using alternative theories of pharmaceutical action, they felt obliged to nod towards enduring perceptions of coral's beneficial properties within the Galenic framework. These include its role as a suitable treatment for the blood and blood loss, as a gentle medicine beneficial for the young and as a way to achieve balance or *eukrasie*. While various ideas about fermentation and balancing acids and alkalis were circulating and discussed at an intellectual level, in practical terms, coral was being prescribed for the same type of conditions attributed to Galen. Indeed, it is likely that these physicians' patients, for whom Galenic theory was so familiar, continued to understand coral as a Galenic simple and framed it in those terms when consulting a doctor.

13.7 Conclusions

Despite the proclaimed fears of physicians such as Harris and Rivière that innocent and safe medicines such as coral would be lost amidst irresponsible and dangerous innovation, the benefits of coral were simply reconfigured as physicians practising in urban centres with high mortality rates took a pragmatic approach. While Wear and Nutton have argued that Galenic medicine had an enduring popularity and 'flexibility', coral highlights a desire for change in terms of seeking to treat more people more efficiently combined with a recognition that old familiar medicines had a vital role in maintaining public trust in the role of the physician.[104]

[104] Wear. *Knowledge and Practice*, 408-16; Nutton. "Renaissance Galenism".

The belief that coral was gentle was highly significant. Amidst medicines which frequently had harsh side effects and possibly toxic results, there were few risks associated with prescribing it. No doubt a coral syrup was much more pleasant to take than some alternatives, both in terms of other Galenic simples and chemical preparations. The blood red colour made a visual connection with its role in treating blood disorders and reviving pale and wan children. Perhaps most importantly, in a diverse medical landscape, coral survived challenges to Galenic medicine, its properties explicable within multiple concurrent frameworks. Or indeed, a familiar treasured simple such as coral may have bolstered Galenic medicine in common practice even as its popularity waned at an intellectual level.

Coral as an internal medicine prescribed by physicians fell out of favour in the late eighteenth century.[105] However, coral is currently available in pill form as a calcium carbonate supplement and a recent scientific study has claimed that marine sources such as coral can significantly increase the availability of calcium for supplementation.[106] Calcium is an essential micronutrient and supplementation is recommended to treat conditions relating to blood clotting, seizures, and dental and bone health.[107] These are similar therapeutic applications to those listed in texts attributed to Dioscorides and Galen and debated in seventeenth-century England. Further research into Greek and Byzantine texts attributed to Galen may shed more light on understandings of coral which influenced early modern medicine in England. However, this paper highlights how a focus on a single medical material offers insight into how a Galenic simple can become a trusted ally and familiar friend over centuries, particularly if, unlike many other drugs throughout history, it obeys the Hippocratic Oath, 'do no harm'.

[105] Harris. "Protection of Innocents", 291.

[106] Barroso. "Coral in Petrus Hispanus", 278; Xu, Yangli, Jian Ye, Deqing Zhou, and Laijin Su. 2020. "Research Progress on Applications of Calcium Derived from Marine Organisms." *Scientific Reports* 10: 18425. https://doi.org/10.1038/s41598-020-75575-8 [last access 24 February 2025].

[107] Mikaelsson, Marienne E. 1991. "The Role of Calcium in Coagulation and Anticoagulation." In *Coagulation and Blood Transfusion. Developments in Hematology and Immunology*, edited by Cees T.S. Sibinga, Pabitra C. Das, and Pier Mannuccio Mannucci, vol. 26 (Boston, MA: Springer), 29–37.

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