

# POISONS IN THE PREMODERN WORLD

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Poisons present an intriguing topic in the history of science because of their unique materiality that can often induce damaging changes to living beings. The majority of the scholarship on poisons in the premodern world focuses on Europe, and generally follows two lines of inquiry. The first situates the study of poisons in the history of the field of toxicology, exploring how the idea and use of toxic substances shaped the formation of a new scientific discipline. The second examines the political and social functions of poisons, identifying their roles in configuring familial, legal, and gender relationship. In both directions, historical accounts of poisons tend to focus on the nefarious side, highlighting their power to harm or kill. Beyond Europe, however, poisons have different histories, which are largely untold. Prominently, in China, although the malevolent use of these puissant substances is abundant, there is also a strong tradition of harnessing them as healing agents. Comparing the history of poisons in premodern China and Europe thus reveals the divergent understandings of these powerful materials across cultures. The comparison provides more than just a useful account within the history of illness; it also traces a broader history, from alchemy to politics, of medicine, gender, and society.

## ***DU AND PHARMAKON***

Although poisons have been employed for hunting, warfare, and murder for millennia in China,<sup>1</sup> medical uses of them also emerged early in Chinese history. The paradox of the healing power of poisons is manifested in the ancient meaning of the word *du* (毒). In the modern context, *du* is the standard word for poison, and carries the negative connotations of murder, harm, and substance abuse. Yet, in premodern texts, the meaning of the word is more ambivalent. According to a first-century dictionary, the word means "thickness," which denotes the quality of lofty mountains. Thickness implies heaviness, abundance, and

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<sup>1</sup> Bisset, "Arrow Poisons in China. Part I," 325–84.

intensity; it doesn't carry a negative sense.<sup>2</sup> Since there is no perfect English translation of *du* that captures its paradoxical meaning in premodern China, I use the word "poison" as shorthand for *du*-possessing substances that can *both* harm and heal.

The ambivalent meaning of *du* is patently expressed in Chinese medical writings, in which the word speaks above all of the potency of drugs. *Du* was a primal index to categorize medicines in classical Chinese pharmacy. The first pharmacopoeia in China, *Divine Farmer's Classic of Materia Medica* (Shennong bencao jing, ca. first century), divides its 365 drugs into three groups based on the level of *du* they possess: most of the drugs in the bottom group carry *du*, which are employed to cure illness; drugs in the middle group are either with or without *du*, which aim to prevent illness and strengthen the body; drugs in the top group are mainly devoid of *du*, which promise to prolong life.<sup>3</sup> As a result, the text incorporated a large number of poisons identified with diverse medical indications. Prominent examples include cinnabar (a mercury compound), aconite (a highly poisonous herb), bezoar (ox gallstones), and cannabis. Poisons were thus an integral part of healing in ancient China.

This *du*-centered scheme of categorizing drugs persisted in pharmacological writings throughout imperial China. With the expansion of Chinese pharmacy, more poisons were added into the repertoire. *Newly Revised Materia Medica* (Xinxiu bencao, 659), the first government-commissioned pharmacopoeia in China, contains a number of poisons that flowed from foreign places into the Tang empire (618–907) thanks to the flourishing of the Silk Road. These include litharge, which is a lead product from Persia, and "unicorn gutta" (or dragon's blood in European sources), which is a resin of dark reddish color from a tree growing in Southeast Asia.<sup>4</sup> Relatedly, foreign antidotes also entered Chinese pharmacy during this period. For instance, theriac, one of the most popular drugs in medieval Europe, appeared in the Tang pharmacopoeia, believed to be a powerful panacea.<sup>5</sup>

The writing of pharmacology in China reached its apex in the sixteenth century, epitomized by *Systematic Materia Medica* (Bencao gangmu, 1596) written by Li Shizhen (1518–1593).<sup>6</sup> Keenly aware of the medical virtue of poisons, Li dedicated a section to "poisonous herbs" (*ducao*) that contained forty-seven plants identified with various medicinal uses.<sup>7</sup> Li also

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<sup>2</sup> Unschuld, "Zur Bedeutung des Terminus tu 毒," 165–83; Obringer, *L'aconit et l'orpiment*, 25–26; Liu, *Healing with Poisons*, 20–22. Obringer's book is a critical source of studying the medical use of poisons in premodern China, especially from a pharmaceutical perspective. Liu's new monograph further explores the topic in the social, political, and religious culture of medieval China.

<sup>3</sup> Unschuld, *Medicine in China*, 17–28; Wilms, trans., *The Divine Farmer's Classic of Materia Medica*, 14–17.

<sup>4</sup> Schafer, *The Golden Peaches of Samarkand*, 211, 220; Chen Ming, *Zhongguo yiliao yu wailai wenhua*, 114–223.

<sup>5</sup> Maejima, "Teriaka kō," 41–154.

<sup>6</sup> Nappi, *The Monkey and the Inkpot*.

<sup>7</sup> Li Shizhen, *Bencao gangmu*, 17.1113–29.

incorporated a new foreign poison that exerted immense impact on late imperial Chinese history. Opium, called “*a-fu-rong*” in Li’s text, was defined as a warming drug that could treat diarrhea. During Li’s days, opium was restricted to the medical realm and its recreational usage, with a wider consumer base, had yet arisen.<sup>8</sup> In sum, poisons remained central to healing in premodern China, consistently taking up a substantial portion of its ever-expanding pharmacy (about 20%, Image 1).

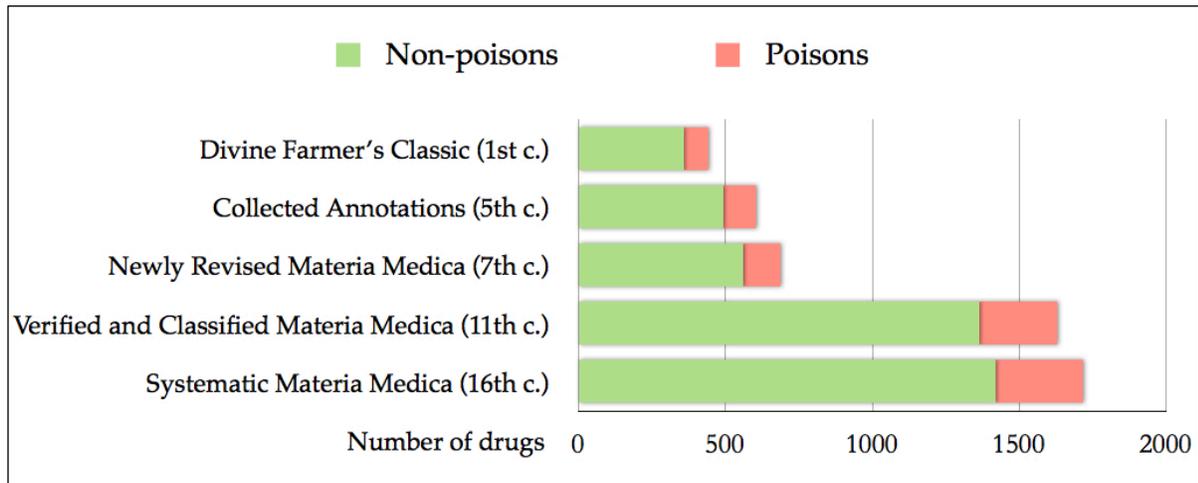


Image 1: Proportion of poisons in premodern Chinese pharmacy. Made by the author.

The therapeutic use of poisons was not unique to China. The English word pharmacology or pharmacy derives from the Greek word *pharmakon*, which means both remedy and poison, among other things.<sup>9</sup> *Pharmakon* appeared in some of the earliest medical and botanical works in Europe. The Hippocratic Corpus (fifth–fourth century BCE) prescribes a number of narcotic drugs such as mandrake, opium poppy, nightshade, henbane, and hellebore. The last one appears most frequently, serving as a purgative to treat gynecological disorders, humoral imbalance, and lung problems. Hippocratic writers also noted the harmful, even lethal effects of hellebore, if administered carelessly. There was no simple division between poisonous and healing substances in the earliest medical writings in Greek antiquity.<sup>10</sup>

The therapeutic role of poisons became strengthened in *De Materia Medica* (first century CE) by the Greek physician Dioscorides of Anazarbus, a foundational work in the history of European pharmacology.<sup>11</sup> Among its 800-odd drugs are many poisonous substances, which

<sup>8</sup> Unschuld, *Medicine in China*, 158–60; Zheng Yangwen, *The Social Life of Opium in China*.

<sup>9</sup> Artelt, *Studien zur Geschichte der Begriffe “Heilmittel” und “Gift”*; Rinella, *Pharmakon*.

<sup>10</sup> Moisan, “Les plantes narcotiques dans le Corpus hippocratique,” 381–92; Girard, *Connaissance et méconnaissance de l’hellébore dans l’Antiquité*.

<sup>11</sup> Riddle, *Dioscorides on Pharmacy and Medicine*.

can be divided into two groups. The first group contains about fifty drugs that, when used to treat illness, produced unpleasant but mild side effects such as headache, dim-sightedness, and discomfort of the stomach. Prescribers would claim that the curative potential of these poisons outweighed their adverse effects. The second group contains about a dozen drugs with stronger effects, including opium poppy, henbane, mandrake, and hemlock. Proper dosage was critical to the use of these powerful substances; Dioscorides repeatedly warned his readers that consuming them in excess could lead to dire consequences—often death. Evidently, the medical use of poisons was salient in ancient European pharmacology.<sup>12</sup>

This ambiguous relationship between medicines and poisons parallels the Chinese concept of *du*. Yet, if we look further, we detect a more pronounced effort in Greek pharmacy to distinguish poisons from medicines. For example, the first-century CE treatise *On Deleterious Substances and Their Prevention* discusses thirty-three poisons, each including the properties of the poison, the symptoms it induces, and the corresponding treatment. The text builds upon a toxicological rationale that each poison generates specific, discernable signs on the body, the proper identification of which then is the key to trace poison and guide remedy. This symptom-based method of poison detection constitutes the hallmark of Western toxicology in antiquity.<sup>13</sup> Although Dioscorides did not create a clear division between poisons and medicines, he did include in his text a number of poisons for which he saw no therapeutic value, such as strawberry tree, sea cole, wolfsbane, yew, dogbane, and meadow saffron. He listed these poisons simply to warn against their use.<sup>14</sup> Despite the blurred boundary between medicine and poison in Greek antiquity, then, a group of substances began to move out of the *pharmakon* continuum and were considered to be poisons without any medicinal virtue. This separation became more evident in late medieval Europe when physicians perceived poisons as ontologically distinct substances from medicines, which paved the way for the rise of toxicology in the early modern era.<sup>15</sup>

By contrast, classical Chinese pharmacy did not see the emergence of toxicological treatises; nor did it include any poison without healing power. All drugs in Chinese pharmacy, regardless of their potential to harm, acquired status as having medicinal value. This does not mean that knowledge of the danger of poisons was unknown in premodern China. Quite the opposite, we find appreciable discussions about poison detection and treatment in Chinese medical writings. Yet unlike the separation of poisons from medicines in medieval

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<sup>12</sup> Beck, trans., *De Materia Medica*; Luccioni, "Pharmakon et problèmes de dosage chez Dioscoride," 29–44.

<sup>13</sup> Touwaide, "Les poisons dans le monde antique et byzantine," 265–81; Touwaide, "Harmful Botanicals," 387–99. Touwaide's studies offer critical insights into the history of toxicology in Greek antiquity.

<sup>14</sup> Beck, trans., *De Materia Medica*, 86, 142, 281–83; Riddle, *Dioscorides on Pharmacy and Medicine*, 65–66.

<sup>15</sup> Gibbs, *Poison, Medicine, and Disease*. Gibbs's monograph offers a crucial study of the medical understandings of poisons and the rise of toxicological thoughts in medieval and early modern Europe.

Europe, such knowledge remained an integral part of pharmacology throughout imperial China.

No example better illustrates the divergence of Greek and Chinese pharmacy than the distinct fates of aconite. In *De Materia Medica*, this powerful herb, called wolfsbane, is cited only as a poison to kill wolves, without any curative value. In no less than seventeen places did Dioscorides offer treatment for aconite poisoning, indicating its great danger.<sup>16</sup> But in China, aconite, called *fuzi*, was valued for its therapeutic power, to the degree that it was hailed as the “lord of the hundred medicines” (Image 2). This is not a hyperbole as the herb was one of the most frequently prescribed drugs in premodern China.<sup>17</sup> This striking divergence is likely derived from the distinct therapeutic rationales in European and Chinese pharmacy. If Dioscorides considered poisons to be the cause of unpleasant side effects, Chinese physicians deemed them to be the very source of curative capacity. In other words, European medicine prescribed poisons in spite of their power; Chinese medicine, because of it.<sup>18</sup>



Image 2: Illustration of aconite (*fuzi*) in *Verified and Classified Materia Medica* (Zhenglei bencao, eleventh century). Source: Library of Congress.

<sup>16</sup> Beck, trans., *De Materia Medica*, 281; Riddle, *Dioscorides on Pharmacy and Medicine*, 66.

<sup>17</sup> Obringer, *L'aconit et l'orpiment*, 91–143.

<sup>18</sup> Liu, “Poisonous Medicine in Ancient China,” 437–38. It is worth noting that aconite encompasses more than 250 species in the genus of *Aconitum*. The one for *fuzi* in China (*Aconitum carmichaelii*) and the one for wolfsbane in Europe (*Aconitum napellus*) are of different species, both of which are highly poisonous.

What are the possible explanations for this striking pharmacological divergence? The different philosophical traditions in China and Europe may have partly contributed to their distinct ways of thinking of poisons. Those influenced by the Platonist perspective questioned any ambiguity within *pharmakon* because it jeopardizes rational thinking, confuses true knowledge, and compromises the integrity of soul.<sup>19</sup> This view, which implies absolute and unchanging metaphysical truth, shaped the later theorization of poisons as distinct entities, especially by the second-century Roman physician Galen.<sup>20</sup> In Chinese antiquity, however, the separation of a metaphysical truth from the phenomenological world was not salient. Particularly in ancient Daoist writings such as the *Laozi* and the *Zhuangzi*, all substances contain both the yin and yang forces, which are mutually transformative and in perpetual motion. This cosmology emphasizes the dialectical relationship among all things that denies stable categorization. In this cultural milieu, it is not surprising that poison and medicine, in the pattern of the yin/yang dynamism, are not fixed and distinct essences. They are, in fact, mutually constitutive.<sup>21</sup>

## POISONS AND ETIOLOGY

The therapeutic rationale of deploying poisons in Chinese pharmacy was tightly connected to Chinese physicians' views of the cause of illness. According to *Divine Farmer's Classic of Materia Medica*, poisons are particularly effective to treat two types of disorders: demonic infestation and *gu* poisoning.<sup>22</sup> The first refers to attacks by malevolent forces (*gui*) that befall a victim with severe symptoms. This etiology can be traced back to ancient China when such forces were imagined to either strike a person on a whim or assault those who were guilty of moral failing.<sup>23</sup> In the medieval period, this way of conceiving illness became more widespread due to the rise of religious healing. Especially in the early development of Daoism during the Era of Division (220–589), adepts in the sect of "Celestial Masters" considered a variety of demons to be responsible for obdurate conditions. They often recommended the carrying of certain poisons as talismans, such as realgar (an arsenic compound), to expel baneful influences.<sup>24</sup> Later medical texts in medieval China, by contrast, emphasizes the

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<sup>19</sup> Derrida, "Plato's Pharmacy," 61–171.

<sup>20</sup> Touwaide, "Galien et la toxicologie," 1887–986.

<sup>21</sup> Kaptchuk, *The Web That Has No Weaver*, 7–15.

<sup>22</sup> Wilms, *The Divine Farmer's Classic of Materia Medica*, 26–27.

<sup>23</sup> Li Jianmin, "They Shall Expel Demons," 1103–50.

<sup>24</sup> Strickmann, *Chinese Magical Medicine*, 58–88.

depleted state (*xu*) of the body as the prerequisite for demonic invasion. As a result, they advise that one build up a sturdy body that would keep the vicious forces at bay.<sup>25</sup>

The second type of disorder treated by poisons is called *gu*, which is itself a poisoning condition induced by vermin. Different from the erratic attack of demonic entities, *gu* poison was believed to be manufactured by a vicious mind. Medieval medical texts provide vivid details of such a preparation: A *gu* maker leaves a miscellany of poisonous worms and snakes in a vessel and let them freely devour each other. The single creature that remains is called *gu* and could afflict people with severe illnesses once introduced into their food.<sup>26</sup> Apparently, *gu* poison involved the magic manipulation of vermin that could trigger disastrous effects. To counter *gu* poison, Chinese doctors regularly prescribed powerful drugs such as aconite and realgar to expunge poisons from the body. One telling formula in an eighth-century text recommends that one collect *gu* vermin from a victim's body and burn them into ashes. Ingesting these ashes can then cure a person suffering *gu* poisoning. Underneath this treatment lies a principle of similarity; things of the same type can repress each other. According to this rationale, *gu* vermin is both an illness and a cure.<sup>27</sup>

Despite their distinct mechanisms—poison as healing because of its similarity or difference—demonic infestation and *gu* poison both invoked the concept of illness as concrete and specific entities that either attacked the body from the outside or undermined it from within. The prescription of poisons, then, sought to destroy or expel these nefarious agents, be it demons, worms, or in any other form, in order to restore the body. A popular saying in China captures this logic well: use poison to attack poison (*yi du gong du*). This ontological way of imagining illness is distinct from a functional model that saw illness as the disruption of harmony and balance in the body, often as a result of the aberrant flow of *qi*. The treatment of an illness in the latter model involved the regulation of the *qi* circulation so as to readjust the body to the normal state. By contrast, illnesses conceived in the ontological model cannot be harmonized or rebalanced; they must be dislodged or annihilated. Hence the use of poisons.<sup>28</sup>

In Europe, intriguingly, a rudimentary idea of “acquired tolerance” emerged in antiquity, that is, ingesting a poisonous substance in small doses over a period of time trains the body to resist poisons. One such antidote, mithridatium, was associated with King Mithridates VI of Pontus (reigned 120–63 BCE), who regularly ingested the compound medicine made from poisons to protect himself from being poisoned. It was widely believed that when the mighty

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<sup>25</sup> Chang, “Jiyi’ yu ‘xiangran’,” 157–99.

<sup>26</sup> Obringer, *L’aconit et l’orpiment*, 225–73.

<sup>27</sup> Chen Cangqi, *Bencao shiyi jishi*, 6.242–43.

<sup>28</sup> Liu, *Healing with Poisons*, 61–80. On the discussion of these two etiological models, see Temkin, “The Scientific Approach to Disease,” 629–47; Rosenberg, *Explaining Epidemics*, 293–304; on the application of the two models in Chinese medicine, see Unschuld, “Traditional Chinese Medicine,” 1023–29; Hinrichs, “The Catchy Epidemic,” 19–62.

king was captured by the Romans and attempted suicide by taking a poison, he failed and had to ask a friend to kill him by sword.<sup>29</sup> Several centuries later, a related medicine with a similar function appeared in medical writings. Called theriac, the drug figures prominently in the works of Galen. He wrote a book on this matter (*On Theriac and Poisons*) in which he developed a formula that contained the key elements of viper's flesh, opium, honey, wine, cinnamon, among many other ingredients. Considering it to be an effective antidote, Galen persuaded Emperor Marcus Aurelius (reigned 161–180) to take it regularly to build up resistance to poisons. Thanks to the prestige of Galen, theriac became a popular antidote and later gained the reputation of a cure-all in medieval Europe.<sup>30</sup>

By contrast, the practice of auto-prophylaxis remained marginal in premodern China. In a story from a third-century work, Cao Cao, the King of Wei (155–220), routinely ingested a small amount of the herb gelsemium and a wine called *zhen*, both of which were highly poisonous, presumably to build his bodily resistance to them.<sup>31</sup> The story resembles that of Mithridates, but such examples are few and far between in premodern Chinese sources. In general, the discussion of antidotes in premodern China was much less extensive than premodern Europe. It was not until the sixteenth century when new ideas and practices of auto-prophylaxis started to flourish in China, exemplified by the development of the technique of variolation to treat smallpox.<sup>32</sup> This cultural difference can perhaps be attributed to the distinct ways of perceiving the relationship between poisons and medicines in China and Europe. European doctors' acute attention to antidotes insinuates their anxiety about the ever-present menace posed by harmful poisons. Chinese doctors, on the other hand, directed their attention to harnessing these powerful substances to cure intractable illnesses. You didn't need to inoculate yourself against poisons if you understood them as inescapably intertwined with medicines.

## POISONS AND EPIDEMICS

One category of illness that poisons were particularly linked to is epidemics. The association concerned both remedy and etiology in China.<sup>33</sup> In particular, there was a strong connection between demonic infestation and epidemics. During the turbulent time of the third century, for example, the collapse of the Han dynasty led to wars, famines, and waves of plagues that

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<sup>29</sup> Mayor, *The Poison King*.

<sup>30</sup> Watson, *Theriac and Mithridatium*; Totelin, "Mithradates' Antidote," 1–19.

<sup>31</sup> The episode is cited in the commentary to the *History of the Wei* (Weishu). *Zhen* refers to a legendary bird whose feathers, once dipped into a wine, could kill a person instantly. See Mayanagi, "Chintori," 151–85.

<sup>32</sup> Chang, "Aspects of Smallpox"; Needham et al., *Science and Civilisation in China*, vol. 6, pt. 6, 114–74.

<sup>33</sup> On general orientations of the history of epidemics in China, see Kuriyama, "Epidemics, Weather, and Contagion," 3–22; Volkmar, "The Concept of Contagion in Chinese Medical Thought," 147–65; Hanson, *Speaking of Epidemics in Chinese Medicine*.

were often believed to be triggered by swarms of demons. Poisons were regularly utilized to combat epidemics. A story from a seventh-century source narrates that when an epidemic broke out in central China in 169, a scholar offered a pill made of poisonous minerals and herbs that powerfully expelled demons and saved the victims. Once the pill was burned in a house, the story further relates, the vapor could also protect people from demonic attack. The later circulation of such accounts hints at the ways poisons were understood as powerful weapons to dispel malign entities.<sup>34</sup>

There were other ways of understanding epidemics in premodern China than as demonic infestation. Medical texts, for example, emphasized the spread of poisonous *qi*. A third-century lexicon glosses the contagious illness of *zhu* as a condition in which a recently dead body might emanate noxious *qi*, which can pour into a healthy body, leading to further illness and death.<sup>35</sup> The famed physician Zhang Zhongjing (150–219) crystalized the idea into a systematic theory that proved influential in classical Chinese medicine. Called “cold damage” (*shanghan*), the disease category designates a set of acute, severe, and infectious conditions often induced by the poisonous *qi* penetrating the body from the outside. To combat such conditions, Zhang regularly prescribed poisons often of heating nature to dispel the cold, virulent *qi* out of the body—we find aconite appears in one-fifth of all his formulas.<sup>36</sup> The Han physician’s works became influential centuries later during the Northern Song period (960–1127) when the government canonized and disseminated a series of medical texts aided by printing.<sup>37</sup> A wave of epidemics that ravaged eleventh-century China played a key role in the state’s decision to promulgate Zhang’s treatises. Unsurprisingly, the period also witnessed the substantial expansion of pharmacy, incorporating many more poisons into the healing repertoire (see Image 1).<sup>38</sup> For example, refined arsenic (*pishuang*, arsenic trioxide) became a popular drug during this period to treat malaria-like disorders, manifesting Chinese physicians’ continuous effort of deploying poisons to fight epidemics.<sup>39</sup>

The connection between poisons and epidemics was also patent in premodern Europe. The link can be traced back to the ancient period; Galen, for example, proposed that external materials such as poisons or seeds of plague could trigger contagious diseases that killed many. This ontological view of disease, however, remained marginal in his writings,

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<sup>34</sup> Sun, *Beiji qianjin yaofang jiaoshi*, 9.340.

<sup>35</sup> Li Jianmin, “Contagion and its Consequences,” 201–22.

<sup>36</sup> Mitchell, Ye, and Wiseman, trans., *Shang Han Lun*.

<sup>37</sup> Hinrichs, “Governance through Medical Texts and the Role of Print,” 217–38; Brown, *The Art of Medicine in Early China*, 110–29.

<sup>38</sup> Goldschmidt, *Evolution of Chinese Medicine*, 69–136.

<sup>39</sup> Obringer, “Song Innovation in Pharmacotherapy,” 192–213.

overshadowed by the conception of humoral imbalance accounting for diverse ills.<sup>40</sup> In the medieval era, poison-oriented etiology became more useful for explaining epidemics. The Black Death in the fourteenth century was a critical moment for the development of this exposition. The devastating consequences of the epidemic urged physicians in Europe to come up with new explanations outside the categories of humoral imbalance. Prominent among them was the notion that the epidemic was induced by poisonous air that, once penetrating the body and reaching the heart, led to one's demise. Different from the classical explanation of complexional imbalance, this new discourse emphasized the putrefying power of poison, with its characteristic "special form," that corrupted the body and destroyed life. In the following centuries, European physicians further elucidated such "special form" of poisons that made them a distinct category of substances outside the humoral framework, and linked poisons to various diseases.<sup>41</sup> Besides the environmental factors, human actors were also blamed for epidemics. Similar to *gu* poisoners in medieval China, they were accused of spreading the disease by deliberately poisoning the waters, air, and foods. During the Black Death, marginalized groups in society—religious minorities, the poor, women, foreigners—were particularly susceptible to such stigmatization, a phenomenon that lasted to the early modern era.<sup>42</sup> Poisons served an etiological function by facilitating both extra-humoral accounts of disease and the placing of blame on specific human actors.

## POISONS, ALCHEMY, AND THE BODY

Poisons figured prominently in alchemy in both China and Europe. Often called "outer alchemy" (*waidan*) in China, alchemists set up elaborate devices and followed sophisticated procedures to produce extraordinary medicines, or elixirs, that promised to not just transmute base metals into silver or gold but also, and more importantly, elevate one's body to higher states of being to become immortal. Alchemy has a long history in China. From its inception during the Han period (206 BCE–220 CE) to its ultimate decline in the tenth century, the practice lasted more than a millennium. The majority of alchemical writings in China are preserved in Daoist scriptures.<sup>43</sup> The materials employed in this tradition were mainly minerals, including mercury, arsenic, sulfur, and lead. Sharing drug knowledge in medical literature, Chinese alchemists recognized the potency (*du*) of these substances, the consumption of which often induced violent effects on the body.

There is a large body of literature examining the history of Chinese alchemy. Joseph Needham and his collaborators conducted pioneering studies that focus on the scientific

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<sup>40</sup> Nutton, "The Seeds of Disease," 1–34.

<sup>41</sup> Gibbs, *Poison, Medicine, and Disease*, 116–49.

<sup>42</sup> Arrizabalaga, "*Pestis Manufacta*," 62–80.

<sup>43</sup> Schipper and Verellen, eds., *The Taoist Canon*, vol. 1, 99–106, 377–401; vol. 2, 850–69.

elements in this tradition as seen through the lens of modern chemistry.<sup>44</sup> Other scholars went beyond the positivist framework and explored the theoretical foundation of alchemy in China's own cultural milieu, with due attention to the cosmological thinking and ritual procedures that afforded meanings to alchemical operations.<sup>45</sup> Due to the abundant use of poisons in this tradition, we find many accounts of elixir poisoning in medieval Chinese sources, which prompted heated debates among alchemists, physicians, and scholars.<sup>46</sup> The phenomenon begs the following question: Why did Chinese alchemists avidly ingest elixirs despite their alarming danger? Approaching this question gets to the heart of the unique effects of poisons on the body as conceived in Chinese alchemy.

The first element of an answer concerns the materiality of poisons. Chinese alchemists considered certain poisonous minerals to be both robust and mutable, hence ideal for making elixirs. According to the fourth-century alchemist Ge Hong (283–343), hardy minerals, such as cinnabar (a mercury compound), were prime materials for alchemy because, unlike fragile herbs that perish easily, they withstand decay and last much longer. Once ingested, the materiality of these sturdy minerals was understood to alter the body, making it similarly enduring. Additionally, the fluid transmutation between red cinnabar and white mercury made them magical materials that could trigger drastic changes of the body. The unique nature of cinnabar, thus, justified its ingestion to strengthen and transform the body.<sup>47</sup>

What happened to the body of an alchemist who took a poisonous elixir? A specific notion of immortality was at play. Different from the idea of immortality in Western Christianity that implicated a disembodied soul and a fixed state in Heaven for all eternity, immortality in Chinese Daoism concerned multiple levels of bodily state that operated in a continuum between the terrestrial and celestial worlds. Depending on the quality and quantity of a poisonous elixir, one could achieve different levels of transcendence that correlate to different degrees of life extension. Immortality in this context is more dynamic, linked to the changing states of the body. Ge Hong, for example, conceived of three levels of immortality in a hierarchy—those ascend to the void, those roam in famous mountains, and those die first and metamorphose later—and correlated them to the amount of an elixir one ingested. Hence the death triggered by the elixir, to these Daoist believers, was only apparent; one ultimately achieved transcendence.<sup>48</sup>

With such aspiration, the temptation of ingesting elixirs seems irresistible. Yet Chinese alchemists were fully aware of the pains induced by these potent substances. A variety of

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<sup>44</sup> Needham et al., *Science and Civilisations in China*, vol. 5, pt. II, pt. III, and pt. IV; Ho, *Explorations in Daoism*.

<sup>45</sup> Sivin, "Chinese Alchemy and the Manipulation of Time," 512–26; Pregadio, *Great Clarity*.

<sup>46</sup> Ho and Needham, "Elixir Poisoning in Medieval China," 221–51.

<sup>47</sup> Liu and Kuriyama, "Fluid Being."

<sup>48</sup> Ge, *Baopuzi neipian jiaoshi*, 2.20; Pregadio, "Which is the Daoist Immortal Body?," 385–407.

accounts emerged in medieval China that explained these sensations, including intense thirst and piercing pain in the heart. Some alchemists interpreted them as the worrying signs of “fiery poison” (*huodu*) remaining in an elixir and proposed various techniques to eliminate it. Especially during the Tang period (618–907), when Chinese alchemy reached its apogee, many alchemical treatises discuss ways of taming elixirs. Prominent among them were the use of certain yang materials, such as vinegar and sal ammoniac, to eliminate poison in mercury and lead. Rituals also played an important role for detoxification. For example, a seventh-century alchemical text specifies three taboos in the making of an elixir: weeping; calling the name of the demon that destroys the elixir; the presence of mourners, filthy things, and dead newborns. Proper ritual thus requires management of emotions, avoidance of malicious forces, and unpolluted spaces. Any transgression leads to a lethal elixir.<sup>49</sup>

Other alchemists interpreted the elixir-induced sensations in a positive light. An eighth-century alchemical treatise, for instance, offers a vivid description of the violent effects of elixirs on the body, including itching, swollen limbs, nausea, diarrhea, vomiting, and headache and abdominal pain. Yet instead of regarding these symptoms as pathological, the text considers them to be the signs of therapeutic therapy. The underlying rationale is that the powerful elixir would trigger the purification of the body by eliminating latent illnesses, which prepares one for their eventual transcendence. Such drastic experiences, however, should not last long; once the malady is removed, one should begin to feel normal again. Otherwise, medical intervention must be provided to alleviate the symptoms. This positive interpretation of bodily pains was not unique to alchemists. In fact, the text cites an ancient aphorism to justify the explanation: “If a medicine does not cause dizziness, it cannot cure severe illness.” Medieval Chinese physicians readily adopted such reasoning to account for the effects of poisons on the body.<sup>50</sup>

Alchemy in Europe, with a history that can also be traced back to antiquity, involved two major goals: to transmute metals and to enhance the body. Most of the studies have focused on the first aspect, exploring its technical innovations, diverse practices in elite and non-elite circles and among women, and its connections to modern chemistry in the early modern era.<sup>51</sup> The second aspect, medical alchemy, emerged in Greek antiquity and became more prominent in the early medieval period, especially in the Islamic world exemplified by the writings of Jābir and Rhazes in the ninth century.<sup>52</sup> In the late medieval period, alchemists in England such as Roger Bacon and George Ripley passionately proposed the ingestion of

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<sup>49</sup> Huangdi *jiuding shendan jingjue*, 19.14a; Pregadio, *Great Clarity*, 79–99.

<sup>50</sup> Liu, *Healing with Poisons*, 164–66.

<sup>51</sup> The body of literature on European alchemy is large. Representative studies and surveys are: Smith, *The Body of the Artisan*; Moran, *Distilling Knowledge*; Nummedal, *Alchemy and Authority in the Holy Roman Empire*; Principe, *The Secrets of Alchemy*; Ray, *Daughters of Alchemy*.

<sup>52</sup> Temkin, “Medicine and Graeco-Arabic Alchemy,” 134–53.

certain purified alchemical ingredients, such as mercury, for life prolongation.<sup>53</sup> This idea was further elaborated by the Swiss alchemist Paracelsus (1493–1541), who famously claimed that “all things are poison, and nothing is without poison: the *Dosis* alone makes a thing not poison.”<sup>54</sup> Although this idea of poison sounds *pharmakonic*, the bulk of Paracelsus’s discussion reveals a rather different message: all things contain the beneficial and harmful components, and the latter must be removed through alchemical purification to allow the former to fully function and render health benefit. The trace of irreversibly bad poison is palpable.<sup>55</sup>

In comparison, medieval Chinese alchemists were equally aware of the importance of eliminating poison in their alchemical endeavor, yet they paid more attention to the reversion of poisons, such as mercury and lead, back to the primordial oneness, often imagined as a state of pure yang. In Daoist cosmogony, this pure yang state refers to the origin of cosmos that precedes the differentiation of all things. It is also a state that escapes time. By ingesting such a timeless substance produced by reversing the cosmic unfolding inside a crucible, Chinese alchemists sought to transform their bodies to a similar state beyond time, thereby achieving immortality.<sup>56</sup> Hence, it was the transformation, not separation, that figured more conspicuously in Chinese alchemical thoughts.

Beyond alchemy, the link between poisons and transformation also figured saliently in Chinese medicine. Precisely because there was no categorical distinction between poisons and medicines, Chinese doctors devised a variety of techniques, such as dosage control, combination with other ingredients, and drug processing, to transform poisonous substances into curative agents. This fluid materiality of drugs configured by technical intervention merits our attention; the effect of any substance—whether it healed as a medicine, or killed as a poison, or altered a person’s body in myriad other ways—varied remarkably according to the way in which it was prepared and administered. Any poison in Chinese pharmacy was not deemed as an independent, self-sufficient entity with a fixed essence, but as something acting in an assemblage—to borrow the term from Gilles Deleuze and Félix Guattari—in which it is always disposed to transformations.<sup>57</sup>

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<sup>53</sup> Bagliani, “Rajeunir au Moyen Age,” 9–23; Getz, “Roger Bacon and Medicine,” 337–64; Rampling, *The Experimental Fire*, 61–99.

<sup>54</sup> The quote is from Paracelsus’s *Seven Defenses*, III, cited in Gibbs, *Poison, Medicine, and Disease*, 201. On Paracelsus and alchemy, see Webster, *Paracelsus*; Moran, *Paracelsus*.

<sup>55</sup> Gibbs, *Poison, Medicine, and Disease*, 200–204; Hedesan, “Alchemy, Potency, Imagination,” 81–102; Moran, *Paracelsus*, 68–93.

<sup>56</sup> Pregadio, “Elixirs and Alchemy,” 179–80.

<sup>57</sup> Liu, *Healing with Poisons*, 39–58. On the notion of “drug assemblage,” see Deleuze and Guattari, *A Thousand Plateaus*, 282–86.

## POISONS, POLITICS, AND GENDER

For historians of medicine, poisons thus could bring many benefits. But more broadly, in Chinese history and otherwise, there are abundant accounts of the nefarious use of poisons, real or imagined. Aconite, for example, was often employed in court murders precisely because of its dual function of medicine and poison—a murder that took place in the first century BCE involved a court physician who used aconite to covertly kill the empress. The physician claimed that she prescribed the “medicine” to help the empress recover from a recent childbirth but likely manipulated the dose of the poisonous herb to end her life. The murder was concealed by the reality that women often died after giving birth at the time.<sup>58</sup> Unsurprisingly, governments in China from antiquity established a series of regulations and legal codes to detect poisons and punish poisoners. One early method of poison detection is drug tasting. The Han court in the first century designated an officer titled “Directorate of Drug Tasting” who was responsible for trying a medicine before presenting it to the emperor. The system became more elaborate in later periods; during the Tang era, for example, the court established the Palace Drug Service that provided medical services to the imperial house. The institution included physicians of various specialties and a large number of artisans who prepared drugs. To guarantee safety, a medicine produced by the service was tasted by two court officers and the crown prince before entering the mouth of the monarch. Those who were negligent in either preparing or prescribing a medicine were subject to severe punishment. A similar mechanism was also established to safeguard the diet of the royal family. It is hard to imagine a more stringent system to prevent poisoning.

Beyond the court, governments in medieval China issued legal codes to regulate the use of poisons. According to the *Tang Code* (Tanglü, 653), the earliest legal code in China that is extant in entirety, those who use poisons to kill people will be executed. Those who sell poisons will be punished too, but only if they collude with the buyers who have the sinister intention. This specification is noteworthy, which indicates that the sellers could offer poisons for a legitimate purpose, that is, to heal a person. The blurred boundary between medicines and poisons reappears in legal documents. That being said, the Tang court made an effort to restrict the circulation of highly poisonous substances, such as *zhen*-bird poison and gelsemium, and prohibited private families to possess them. By controlling access to these dangerous materials, the state tried to prevent them from falling into the “wrong hands.” But even gelsemium, a highly poisonous herb grown in the south, had therapeutic virtue recognized by medical literature at the time. Due to its limited access, local people had to identify suitable substitutes to achieve healing.<sup>59</sup>

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<sup>58</sup> Li Jianmin, “Nüyi sha’reu,” 285–324.

<sup>59</sup> Liu, *Healing with Poisons*, 82–86. On the substitution for gelsemium in local practice, see Liu, “Transmission of Drug Knowledge in Medieval China.”

Political regulation of poisons in China concerned not just the control of specific substances but also the subjugation of those who were accused of poisoning. I have mentioned the *gu* poisoners, who were suspected of manipulating virulent vermin to harm people. There are two important features of *gu* in premodern China. First, the practice has a particular geographical association. During the Tang period, it was linked to regions south of the Yangzi River. In the eyes of the rulers, who established their political center in the north, the southern regions were believed to be dangerous, mysterious, and uncivilized, full of poisonous creatures and pernicious effluvia. The *gu* practice thus embodied an unfamiliar and intractable south that defied proper ruling.<sup>60</sup> Second, *gu* preparers were often women, especially those from the lower echelons of the society. This association can be traced back to antiquity when the female body was perceived to be the site of delusion and seduction, ideal for carrying out black magic. Moreover, women often engaged in shamanistic practice in the south, making them particularly prone to accusations of such vicious deeds. Altogether, *gu* poison, emblematic of the unruly south and of furtive women, posed a serious menace to state control. In response, governments in medieval China established stringent policies to punish accused *gu* practitioners, banishing them to the periphery of the empire. As a result, those convicted of practicing *gu* were marginalized in both geographical and social spaces. During the late imperial era, they were also linked to minority peoples, especially the Miao in the southwest.<sup>61</sup> Lurking at the edges of empire, they remained an ever-present menace to the established order. The regulation of poisons was always a matter of political control.

The association of poisons with women and political control is not unique to China. Perhaps most well-known is the persecution of witchcraft practice, which often involved the manipulation of poisons, in early modern Europe.<sup>62</sup> The connection is already visible in antiquity. In the time of an epidemic, women were regularly accused of administering poisons to spread the plague.<sup>63</sup> In medieval Europe, this female association of poisons remained strong partly due to the fact that women operated in a domestic space where they had easy access to food, clothing, and medicine. The secretive and elusive nature of poisoning aligned well with women's social position that did not allow them to take actions in a more direct and forceful manner. Yet it is important to note that the link between women and poison, similar to the situation in China, is more rhetorical than real. There is no evidence that women committed crimes of poisoning more often than men in medieval Europe—in fact, men still dominated this type of murder. It is rather the social imagination and the

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<sup>60</sup> Schafer, *The Vermilion Bird*.

<sup>61</sup> Diamond, "Miao and Poison," 1–25.

<sup>62</sup> Bever, "Poison," 906–907.

<sup>63</sup> King, "First Behead Your Viper," 29–30.

anxiety elicited by such an imagination that produced the cultural stereotype of female poisoners.<sup>64</sup>

In both premodern China and Europe, poisons acted as a powerful yet surreptitious weapon that destabilized political order and elicited social anxiety. How could the same type of substances also serve as useful medicines? In China, the answer lies not so much in the innate qualities of poisons as in the *context* in which they were administered. A superb doctor could dexterously harness aconite to cure an intractable illness while the same herb, used by an inept or ill-natured practitioner, could harm or even kill. Mercury was undoubtedly a lethal poison, yet upon sublimation by zealous alchemists, it could turn into a life-enhancing wonder drug. *Gu* vermin might be deployed by celebrated male healers as an effective antidote to treat *gu* poisoning, yet the same material, once falling into the hands of suspicious female practitioners, became the supply of witchcraft that was swiftly condemned by the state. Therefore, it was not the substance itself, but the ways of its preparation and usage in the medical context as well as its assigned value or blame in the social, political, and cultural contexts that defined its identity. Poison is a good thing to think with. For it compels us to ponder the shifting boundaries and intrinsic paradoxes that figured conspicuously in the history of science and beyond: between the curative and the noxious, the good and the bad, the legitimate and the illegitimate, and the mortal and the immortal.

## CONCLUSION

In his classic 1925 work *The Gift*, the French anthropologist and sociologist Marcel Mauss notes the double meaning of the German word *Gift* as gift and poison. He further comments that “[t]he theme of the fateful gift, the present or possession that turns into poison, is fundamental in Germanic folklore.”<sup>65</sup> The duality of gift and poison was never limited to Germanic or European folklore, however. There is no doubt that there is a long tradition of the medical use of poisons in Europe, evidenced by the ancient concept of *pharmakon*. Physicians from Dioscorides, Galen to Paracelsus all paid due attention to such usage.<sup>66</sup> Yet there is also a strong tradition in premodern Europe that studied poisons as a distinct group of substances from medicines, in other words, a long history of toxicological thinking. Such thinking was already evident in antiquity, manifested by Galen’s writings, and became more pronounced in late medieval Europe. Concomitantly, the fervent pursuit of antidotes to

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<sup>64</sup> Collard, *The Crime of Poison in the Middle Ages*, 97–101. Collard’s book remains a critical source of understanding the social functions of poisons in medieval Europe.

<sup>65</sup> Mauss, *The Gift*, 61–62.

<sup>66</sup> Two important collections of essays examining this topic in European history are: Collard and Samama, *Le corps à l’épreuve*; Grell, Cunningham, and Arrizabalaga, “*It All Depends on the Dose*.”

combat poisons persisted throughout premodern Europe, and continued in the early modern period with the experimentation on antidotes by poison trials.<sup>67</sup>

By contrast, the separation between poisons and medicines was much less evident in premodern China—no medical works were explicitly dedicated to poisons and antidotes in China until the sixteenth century, a change in stance possibly influenced by European medicine.<sup>68</sup> In premodern China, no material essence defined what was a poison or medicine or any substance in the world. It was not the distinction but perpetual transformation among myriad things that had been stressed.<sup>69</sup> The lesson may shed fresh light on the understanding of pharmaceutical practice today, from the pressing issue of licit drug abuse, exemplified by the American opioid crisis, to the debates surrounding the decriminalization of cannabis.<sup>70</sup> Debates around carcinogenicity and pollution also pose questions about the danger of particular substances that draw on similar terms: is poisonous air or water a question of type or of quantity, of balance or of purity? Interrogating the very notion of “poison” helps frame many of these debates in deeper perspective.<sup>71</sup>

There are, of course, discussions of poisons in many other traditions. For example, prior to the intense study of poisons in late medieval Europe, Arabic medical writers, such as Ibn Wahshīya (ninth century), had already produced devoted treatises on poisons and poison treatment, which played an important role in transmitting early Greek and Indian toxicological knowledge to Western Europe.<sup>72</sup> In Tibetan culture, although there was a distinction between poison (*duk*) and medicine (*men*) at the conceptual level, the boundary was less stable in practice—mercury sulfide compound, for example, has been used to enhance the potency of medicines since the thirteenth century.<sup>73</sup> The duality of poison and medicine was also prominent in Ayurvedic healing, exemplified by the frequent use of aconite and arsenic.<sup>74</sup> In precolonial Africa, though no systematic studies have been conducted, preliminary inquiries suggest a similar ambiguous relationship between harmful

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<sup>67</sup> Rankin, *The Poison Trials*.

<sup>68</sup> One such text is *Formulas to Counter a Hundred Poisons* (Jie baidu fang), written by Gao Lian (1573–1620).

<sup>69</sup> To be sure, there are exceptions. *Gu* poison and people who manipulated it were usually perceived to be non-transformable in premodern China.

<sup>70</sup> Herzberg, *White Market Drugs*; Lee, *Smoke Signals*.

<sup>71</sup> Kohrman, Gan, Liu, and Proctor, eds., *Poisonous Pandas*; Fleming and Johnson, eds., *Toxic Airs*.

<sup>72</sup> Levey, *Medieval Arabic Toxicology*.

<sup>73</sup> Gurke, *Taming the Poisonous*.

<sup>74</sup> Arnold, *Toxic Histories*, 24–27.

and curative substances.<sup>75</sup> Although the juxtaposition between China and Europe inevitably falls short of accounting for many of the subtleties present in other contexts, the duality of poisonous materials seems echoed throughout. Whether a substance is or is not labeled as a poison is never solely a matter of its deleterious effects.

Overall, scholarly literature on poisons in the premodern world has primarily focused on the medical understanding and the social and political uses of poisons in Europe. These studies position the medical investigations of poisons in the history of toxicology and trace the political regulation of poisons and social responses to poisoning. Recent scholarship goes beyond the European context and explores the rich traditions of poisons in other parts of the world. The story in China does not just reveal an intimate relationship between poisons and medicines but also, in a more fundamental way, redefines the notion of poison itself. Study of poisons in the non-Western societies thus offers insights into the materiality of these potent substances as configured by specific cultural conditions. Besides examining the unique history of poisons in a given culture, it is also important to explore the circulation of poisons and knowledge associated with them across cultural spheres, a topic that awaits future research. Recent works on the transmission of scientific knowledge across premodern Eurasia have charted a new direction of inquiry in the history of science, and it would be interesting to see how poisons fit into this global picture.<sup>76</sup> Furthermore, we may also ask the important question of how the premodern knowledge of poisons in a given culture was transformed in the modern era, with the introduction of Western scientific knowledge in recent past.<sup>77</sup> For instance, how did the concept of *du* change from an ambivalent term in premodern China to a word of negative connotation today? Such inquiries will shed light on the changing meaning and usage of poisons over history as a result of the dynamic negotiation between different systems of knowledge.

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<sup>75</sup> Whyte, "The Power of Medicines in East Africa," 218–20.

<sup>76</sup> Smith, ed., *Entangled Itineraries*; Yoeli-Tlalim, *ReOrienting Histories of Medicine*.

<sup>77</sup> New studies have started to address this issue in the African and Indian contexts. See Osseo-Asare, *Bitter Roots*, 107–30; Arnold, *Toxic Histories*.

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