Introduction

Mystery and danger spring to mind at even the mere mention of poison. It is no surprise then, that histories of poison easily captivate their audience with scandalous tales of covert assassinations and unscrupulous political aspirations. As a result, the history of poison—invariably linked to the so-called barbaric "Dark Ages" and the quick hands of the Borgias—has been presented anecdotally as a history of poisonings, with relatively little attention to the concept of poison itself.[1] As characterized by these histories, poison figures as a relatively well-defined category of substance—conceptually, if not physically, antithetical to medicine—and often implicitly defined by modern quantitative measures, such as toxicity and lethal dose.[2] Yet such a tidy formulation obscures the variety and latitude of definitions and conceptions as debated in medieval and early modern medical literature. It hides, for example, the nuanced, natural philosophical discussion regarding the theoretical spectrum of drug action, the ways physicians continually reshaped premodern toxicological literature—iteratively refining distinctions between medicine, drug, and poison—as well as understanding poison in terms of disease causation and contagion. These kinds of assumptions can make it even harder to see the value of medieval and early modern toxicology, which continues to be written and discussed by modern toxicologists who, in quintessential Renaissance humanist fashion, pay homage to their classical Greek and Roman predecessors but disparage the medieval period, which "for medicine and toxicology [was]

1. Recent examples include Minois 1997; Mann 1994; de Maleissye 1991.

2. Even though focused on the crime, a more nuanced view of poison can be found in Collard 2003.

mostly a period filled with a belief in folklore, superstitions, and religion."[3] To be sure, the history of poison is far richer than its role as an enigmatic murder weapon, and the history of toxicology must no longer skate lightly over the late medieval and early modern periods.

This book presents a uniquely broad history of premodern toxicology and its significance in exploring how late medieval and early modern (c. 1250-1600) physicians discussed the relationship between poison, medicine, and disease. Drawing from a wide range of medical and natural philosophical texts—with an emphasis on treatises on poison, pharmacology, plague, and the nature of disease—this study explores a neglected but revealing late medieval and early modern ontological debate about the existence, nature, and properties of a category of substance fundamentally harmful to the human body and the corresponding implications for medical theory and practice. Focusing on the *category* of poison (*venenum*) rather than on specific drugs reframes the standard histories of toxicology and etiology, as well as shows how these aspects of medicine (even when not formalized as independent disciplines) interacted and shaped each another. More broadly, it sheds new light on late medieval and early modern medical thinking about the nature of the human body and the processes of poisoning, corruption, and putrefaction.

My focus on the concept of poison both complicates and complements previous medical and literary histories that have discussed poison predominantly as an unproblematic and unambiguous opposite of medicine. As opposed to these works, this study centers on broader questions and themes that appear in medical literature on poison, such as how various substances should or should not be defined in terms of their interaction with the human body, how a certain category of substance—a poison—might be responsible for the origin and spread of disease as well as processes of corruption and putrefaction inside the human body. Perhaps the best way to summarize the key themes of this book is to invoke the constellation of questions that physicians debated: is there a category of substance that is fundamentally detrimental to the body in all circumstances, even in small amounts? Is there a defining feature or virtue that can distinguish between food, medicine, and poison? What

3. Hayes and Gilbert 2009.

does a poison actually do to the human body? If a body becomes poisoned, does it then possess a property of poisonousness that can be transferred to other bodies? What is the role of poison in the cause and spread of disease? In times of illness, to what extent should therapeutics focus on removing a poison from the body rather than rebalancing the humors or qualities?

These kinds of questions provoked broader philosophical inquiries as well. Medical humanists of the sixteenth century found themselves reconciling the ancient Greek notion of *pharmakon*, which encompassed a broad array of drug action, with the more contemporary Latin *venenum*, which by the late thirteenth century had become closer in meaning to poison or venom. I show how this linguistic concern precipitated physicians' efforts to separate medicine and poison on theoretical grounds in favor of careful descriptions of different categories of poison and the various possible physiological effects of poison on the body. With attention to specific questions about poison as well as their broader implications for medical thinking, this book breaks new ground in the way it embraces the inherent difficulties and ambiguities of these questions to provide the first history of toxicology in the late medieval and early modern periods—a toxicology that stands separate from, though also a product of, a classical toxicology that focused on identifying and treating cases of poisoning.

In considering early modern physicians' interest in the role of poison in disease causation, this study also reevaluates the traditional role assigned to Paracelsus in the long history of toxicology, in which his dictum that "the dose makes the poison" (as it is often sloganized) marks an irreversible turn toward modern understandings of toxins. The significant impact of the broader Paracelsian movement notwithstanding, the problem with this popular conception of Paracelsus's novelty is that it derives from an incomplete history of toxicology that largely omits the late medieval period, a history in which the coincidence of Paracelsus and the stereotypical Renaissance restoration of antiquity serves sufficient basis

for seeing Paracelsus as an inflection point in history of toxicology.[4] Furthermore, his celebrated and supposedly novel idea that so-called poisons can act as cures if given in proper amounts was hardly new with Paracelsus, as it embraced the same attitude about drugs as the ancient Greek *pharmakon* and had persisted for some time even in the Latin *venenum*. So what was Paracelsus reacting against?

This book shows how the notions of poison and medicine became increasingly dichotomized in the later Middle Ages, at least in theory (though this was much harder to see in practice), and that it was this dichotomy that at least partially motivated Paracelsian emphasis on the utility of strong drugs (at least after poisonous impurities had been removed from them). But how and why did Latin medical writers, who eagerly embraced Greek medical frameworks as the base for their own thinking, move away from the spectrum embodied by the Greek *pharmakon*? And why did later medical botanists, early chemists, natural historians, and physicians in the sixteenth century move away from this poison and medicine dichotomy in order to embrace the complex relativity of poison? How should we understand why physicians maintained notions of poison both as a universal cause of disease and litmus test for panaceas that could supposedly cure any disease, and as a highly local phenomenon that could affect the human body in different ways?

Taking poison as the fundamental category of analysis rather than an extreme edge case of pharmacy brings into focus broad questions that show how the concept of poison (and attendant discussions about it) concerned not only dangerous drugs, but processes of harm inside and outside the body, including the origins and spread of disease, and the extent to which these processes might be related. Because the strongest poisons worked unusually rapidly and in miniscule amounts, understanding poison meant, in part, re-evaluating medical frameworks of disease causation. Sometimes this resulted in rethinking antecedent causes, as was the case when some late medieval physicians began to emphasize innate powers more than humoral imbalances to explain the operation of exceptionally strong drugs and poison. To what extent was it useful to think of diseases in general as caused by some kind of

4. This is especially visible in toxicology textbooks, although their accounts merely reflect the lacuna in historical study of medieval and early modern toxicology. See, for instance, Hakkinen et al. 2009, 15.

poison? Was a disease caused by a poison in fact different from other diseases? What was the difference between a poison and a contagion? As the notion of poison was considered in larger contexts, especially in terms of disease transmission and corruption, how did this affect larger medical frameworks? On the whole, these kinds of questions show how physicians' discussions about the nature of poison pertained not only to a certain category of substance, but also to much broader conceptions and concerns about the natures and powers of substances. Physicians debated, for instance, how (and if) poison could transform the body into poison itself (the opposite of nourishment, where the food is transformed into the body)—which would explain how such a small amount of poison can have such an overwhelming affect on the body. What were the fundamental differences between the body, food that nourished it, and poison that destroyed it?

With an emphasis on medical texts dedicated to the topic of poison spanning several centuries, this study shatters any assumptions that texts on poison can be described—as they often are—as a monolithic whole that do little more than provide recipes for poison remedies. Some texts focus on the natural history of poison, some on its role in putrefaction, others on its role in pestilential disease, still others on philosophical debates centered on the properties of poisonous bodies. We can see, for example, the long history of medical theorizing about the powers of a substance's so-called "specific form" and the various ways it was (or was not) employed by physicians trying to explain the nature of poison. This plurality of interests makes texts on poison an especially interesting site for understanding broader medical frameworks and their transformations over the later medieval and early modern periods.

In order to highlight the innovation of late medieval and early modern approaches to poison, I first examine the ways in which the concept of poison was employed and discussed by various Greek, Roman, Byzantine, and Arabic medical authors who became the principal authorities on the topic for later Latin writers. Drawing from the original texts and numerous specialized studies of Greek and Arabic toxicology, I provide an overall picture of how medical authorities discussed poison and the contexts in which they did so. More specifically, I highlight the ambiguous nature of both *pharmakon* and *venenum* in the

tradition of classical medicine that later Latin physicians would gradually transform; I also introduce the key texts and theoretical developments that were most influential for later authors, particularly those of Galen and Avicenna, though they were by no means the only physicians to make important contributions to toxicology. To provide a comparative perspective for later toxicological developments—and to challenge the typical assumptions of continuity between classical and medieval toxicology—I argue that classical medical texts and their derivatives, in contrast to their late medieval and early modern successors, focused primarily on cases of poisoning as opposed to the substance of poison itself.

Having established some textual foundation, I then outline throughout the second chapter new concerns and discussions about poison that developed in medical literature of the Latin West over the twelfth and thirteenth centuries, especially how physicians explicitly endeavored to craft a distinction between medicine and poison. To begin, I show how medical texts and translations produced in the context of Salerno reflect the classical approach to toxicology, namely the condition of being poison rather than the category of substance itself. I then illustrate how the classical approaches to toxicology began to shift as Paris, Padua, and Montpellier in the late thirteenth century became especially important foci for the development of pharmacological and toxicological theory as Latin scholars became acquainted with and integrated Aristotelian natural philosophy, Galenic medicine, and valuable Arabic commentaries. At the same time, physicians, apothecaries, and drug-peddlers gained access to exotic ingredients from expanding trade routes and exploration, making proper preparation of complex drugs considerably more difficult and therefore hazardous for patients. As a result, various legislative efforts banned the inclusion of certain poisons and strong drugs in remedies. But what was the difference between a dangerous drug, a poisonous medicine, or an absolute poison?

With a focus on the fourteenth century, the third chapter describes the emergence of standalone Latin treatises on poison and what makes them unique and distinctive—namely their increasing emphasis on theoretical understandings of poison and how it interacts with the body. I argue that a new kind of medical text and a new kind of toxicology emerged in the early fourteenth century via treatises from several prominent physicians and philosophers

who encouraged the development of a genre of medical text that focused on natural philosophical discussions of the nature of poison. Although a few theoretically minded physicians, such as Galen and Avicenna, had offered abbreviated causal explanations, no systematic effort to understand the causal mechanisms behind poison surfaced before the fourteenth century. I show how texts on poison produced later in the fourteenth century expanded sets of concerns about the nature of poison and the properties of poison and poisoned bodies; I also explore how generally conservative treatises on practical medicine began to address poison in novel ways, further demonstrating that *venenum* had become an interesting topic in its own right.

While medical discussions of *venenum* through the fourteenth century focused on ingested plant, animal, and mineral substances, the plague epidemic subsequently known as the Black Death (c. 1348-50) spurred physicians to reconsider the relationship between poison and disease. I show in the fourth chapter that not only did physicians describe the cause of pestilence as the result of poisonous air (essentially a miasmatic view), they also described the cause of pestilential disease (the resulting fever and symptoms) as a poison inside the body—a novel conceptual move within medical texts. Such efforts forced physicians to rethink antecedent causes, as was the case when some fourteenth-century physicians writing about pestilential disease began to emphasize the causal aspect of the innate powers of poison to cause such a virulent disease. For many physicians, treating pestilential disease came to mean treating a material poison that had come inside the body. I show how late fourteenth-century physicians developed new interests in poisonous bodies and processes by which poison could move around the environment—thus further illustrating how the idea of poison played an increasingly significant role in physicians' understanding of the nature of disease, as well as further dichotomizing the notions of poison and medicine in theoretical terms.

The fifth chapter, centered on the fifteenth century, focuses on the various definitions, categories, and properties of poison—especially how physicians endeavored to define and describe the essence of poison according to an increasingly wide range of natural phenomena. It illustrates, for instance, how physicians more thoroughly explored the

implications of defining a substance like poison through its "specific form," as described by Avicenna and Pietro d'Abano. If poison had a unique form, then that form must have specific properties. But what were they? Drawing equally on practical experience and theoretical speculation, physicians debated a range of properties that poison might have, such as whether poison could be spread by sight, whether the phenomenon known as "multiplication of species" was necessary for the spread of poison, and whether poison could act as nourishment. Especially if there were different kinds of poisons, to what did a "poisonous" property refer? I explore how the emphasis on poisonous properties had implications for curing poison, as exemplified by the way physicians increasingly discussed the sympathy and antipathy of poison and its remedies, and how such analysis helped reshape medical thinking about disease that would feature prominently in the sixteenth century. This chapter also highlights distinctions between cultural and medical invocations and discussions of poison, particularly how they remained largely separate.

The penultimate chapter focuses on the way physicians newly explored the relationship between poison and disease. I first consider how some physicians argued that a generic poison (generally powered by its specific form) was in fact the ultimate cause of virulent and contagious diseases (like plague and syphilis). Rather than an internal humoral balance of poison that caused disease, it was an external, material substance that entered into the body and needed to be directly countered or removed. I also try to unpack the multivariate and contested role of poison in discussions of what we might call ontological etiologies—the physical existence, forms, and nature of causes of disease. Drawing on the model of poison, physicians questioned the necessity of total substance and specific form in etiology, how many diseases this might mean, and the implications for practical medicine. These debates about the role of poison and specific forms in disease reframe the typical history of disease ontology. I argue that we should see poison as a cause of disease that embodied a range of meanings, some of which are not far from particular material causal agents, even if they are not modern laboratory ones.

The conceptual discrepancy between *venenum* and *pharmakon* challenged humanist physicians to reconcile the classical Greek term, *pharmakon*, that signified a broad spectrum

of drug action, to the Latin term, *venenum*, that generally meant something harmful (and distinctly not helpful). This challenge was compounded by the way in which physicians increasingly referred to *venenum* as a cause of disease in general, not only in obvious cases of poisoning or envenomations. The final chapter describes how broad discussions about the nature of disease led physicians to further reshape their thinking and writing about poison, especially how they began to move away from axiomatic definitions of poison and toward canvassing the broad array of ways in which poison could harm the body. We can also see why, even with the stylistic diversity of sixteenth-century texts on poison and the many conceptions of poison contained therein—with emphases on venom, putrefaction, poisonous disease, and debates about whether poison can be generated inside the human body—that these texts must be seen as crucial developments in the history of toxicology.

The medical and natural philosophical texts examined here certainly do not fully encompass all medieval and early modern conceptions of poison. My primary focus has remained on medical texts written by university physicians, many of whom also secured prestigious princely or papal appointments. Although these texts provide only one and necessarily biased perspective into medieval and early modern conceptions of poison, they remain important for their role and subsequent influence on rethinking and reframing toxicology. I pay less attention, therefore, to manuals about drugs that are largely devoid of any pharmacological or toxicological theory; nor have I rigorously compared specific lists of poisons or remedies as propagated through various types of medical literature with an eye to whether a particular substance was labeled as a poison or not. The sources make clear that lists of poisons were derived more often from textual traditions than theoretical frameworks—which often were at odds with each other—and thus quickly frustrate attempts to infer larger conceptions of poison from such catalogs. Although such an effort would surely improve our understanding of the transmission of medical knowledge, it remains work for another project. Even working squarely within the medical context, the broad chronological range and textual scope of this study makes it impossible to treat evenly all relevant texts, people, places, and ideas. With an emphasis on notions of poison across a wide range medical literature over wide swath of time, I have continually sacrificed the trees for the forest, privileging an evaluation of conceptual, linguistic, and stylistic change over a

close reading of any small subset of texts. Of course I have tried to point out exceptions to any trends and qualify developments and deviations. While I consider this study to be revealing and representative of shifting intellectual currents (and the forces behind them), I was, necessarily, highly selective in sampling from the vast array of medical literature in which some significant mention of poison appears.

Although this study focuses on the medical meanings of poison, it does not imply that the way physicians described poison in medical texts is somehow more valuable or authoritative than the way poison was described in other contexts. Indeed, it makes no pretense as a complete history of poison. Careful study of religious sources and the relationship between poison and evil, for example, will provide valuable perspectives that can help reveal the notion of poison in overlapping medical and religious realms. Needless to say, literary references to poison abound, but I have not attempted to unpack the great variety of metaphorical and symbolic uses of poison in literary or dramatic works. Further research on such sources will surely provide a useful complement to the present study. Similarly, because I have restricted myself almost entirely to medical literature in Latin, the dominant language for medieval and early modern theoretical medicine, I have only dabbled in the various vernacular traditions and variations among them that may bring new insight to cultural and linguistic constructions of and influences on concepts of poison. Another view of poison will of course be revealed from trial records about accusations of poisoning, which offer another avenue for exploring the meanings of poison in legal contexts. However, although I have not studied them systematically, the few I have come across show that the legal interpretation of poison by the middle of the sixteenth century (in which the medico-legal perspectives becomes much easier to trace) arises largely out of definitions of poison supplied by the medical literature under investigation here. All this is to say that, despite much work remaining to be done in order to fully reveal the multi-faceted views of poison in the late medieval and early modern periods, this study should provide a useful synthesis and analysis of the relevant medical contexts, perspectives, and debates.

One inherent danger in any history of a slippery notion like poison is the inexorable pull towards essentialism and reductionism that obscures important historical complexities.

Does it even make sense to make any direct comparison between the notion of *venenum* from the thirteenth century with that from the sixteenth? Were physicians and natural philosophers with differing vocational interests and cultural circumstances really writing about the same thing? Well, of course not. And that is precisely the motivation for this study: to outline the different formulations of the concept, which were appropriated and applied in different ways, whether it be about the ethics and dangers of strong drugs, the operational power of compound remedies, action at a distance, or disease causation. One principal reason to follow such a polymorphous concept like poison is because many physicians—and many different *kinds* of physicians—found it useful to do so. Their texts reveal an untold story about the history of poison literature, but also provide a unique window onto medieval and early modern medicine—especially the way in which debates about poison must be seen as central to histories of toxicology and etiology.

A reflection on premodern toxicology, such as this study, is not merely a tour of antiquated scientific and medical ideas, but provide a useful perspective on modern medicine as well. Of course the modern notion of drug can be subdivided into at least three broad and arguably separate categories: over-the-counter, prescription, and illicit. If we need a prescription filled, we might say we go the drug store, but we do not necessarily consider ourselves drug users—even though this is obviously true in a literal sense—since this label is associated predominantly with the illicit category. When we think of poison, we think of brightly colored bottles under the kitchen sink with skulls and crossbones and florescent Mr. Yuck stickers on them—obviously firmly outside the boundaries of medical use. On one hand, then, the idea of a strong dichotomy between medicine and poison persists. On the other hand, even when a drug ad warns us of a dozens of potential and extremely undesirable side-effects, we do not consider that particular drug (or similar drugs) as dangerous or poisonous, but simply a drug that must be used carefully. So in this sense it seems we perhaps have minimized the medico-philosophical debate concerning any meaningful boundary between medicine and poison, even if we still encounter the same issues that have generated centuries worth of medical debate.

Yet even though we recognize the duality of drugs to both help and harm, and perhaps do not feel the need to explicitly clarify what constitutes a medicine or poison in strict categorical or ontological terms, such debates about the ways our bodies interact with ingested substances (whether food, medicine, or poison) have perhaps taken on a different guise than they have disappeared all together. While such discussions might no longer concern the nature of particular categories of substances or particular drugs, they have been replaced by discussions about the nature of substances like sugar, trans-fats, and cholesterol, and how they interact with the body. Although "poison" may be too strong of a word to describe certain kinds of foods with uncertain or potentially deleterious effects (both short-, and especially long-term), many of the medieval and early modern conversations about the difference between food, medicine, and poison have taken on a new relevance today in the sense that they have helped to create the medical framework that now defines our problems and offers solutions. Even if we might use new measures or thresholds by which we might separate food, medicine, and poison, many of the same philosophical values, principles, and questions remain a ubiquitous part of modern medical culture—and continual debate—that we interface with each day. Even if poison itself has receded from the modern debates about the nature of food and healthy diets, its history sheds new light on our modern, but by no means new, confusion about the relationship between food, drugs, poison, and disease.