



Introduction

Imagine a time when priests and inquisitors speculated about the sexual activity of demons, alchemists toiled in soot-stained laboratories to transform lead into gold, and witches flew through the dark of night to participate in wild orgies and feast on the flesh of unbaptized infants. Quack healers on every street corner promised magical cures to a credulous public while, in palaces across Europe, astrologers cast the horoscopes of queens and princes. Philosophers studied the fundamental nature of reality and, at the same time, searched for traces of God in a universe that grew larger and more complex all the time. This is the world at the heart of this book, one filled with the strange, the bizarre, the frightening, and the sacred. You might not realize that magicians played a role in creating the scientific method taught in classrooms today, that occultists laid the foundations for evidence-based medicine, or that religion was central to the study of nature at the height of the “Scientific Revolution.” Yet, all of these things are true.

This book explores how the European worldview evolved between the years 1400 and 1750, and does so through a focus on three sets of beliefs and practices: *magic*, *science*, and *religion*. Together they defined how premodern Europeans understood their world, from the smallest of mundane events to earth-shattering cataclysms and miracles wrought by God. In many respects these realms were not distinct or separate things; for premodern people they overlapped with one another all the time, in ways that might surprise us. Eventually, however, they drifted further and further apart as the known universe expanded both literally and figuratively, leading to the worldview many of us hold today.

The Europe we will examine here existed in a precarious balance between tradition and innovation, anchored to the distant past but also pushing forward in search of unfamiliar worlds and new ideas. After 1400, that balance was threatened by unprecedented levels of

upheaval, conflict, and discovery, leading to a series of profound and irrevocable changes that gave rise to what many call the Western world. At the beginning of our story, the Catholic Church oversaw a unified Christian faith, science was rooted in the philosophies of the ancient Greeks, and most people believed that magic was real. By 1750, philosophers thought of the universe as a vast machine that operated with mathematical precision, the Protestant Reformation had long since splintered Christianity into different sects, and magic was mocked by the educated elite as delusions of the ignorant. This shift, according to many historians, marked the birth of the modern world. Yet, the story in this book is not one of “progress.” There are no descriptions of ignorant premodern people figuring out how the universe *really* works, no tales in which the rational and logical sciences triumph over superstition and ignorance and lead everyone into a glorious future with cars and smart-phones and electricity. Instead, this book is an attempt to meet historical people on their own terms. We will try to put ourselves in their shoes, however imperfectly, and understand how their beliefs about the world changed across almost 400 years.

It is important, however, that I acknowledge a profound limitation to what this study can accomplish. Because this book is essentially a history of ideas, we will be focusing most of our attention on those ideas that became particularly influential, usually as a result of their being recorded and disseminated in writing. Our narrative centers around those individuals who were able to produce, preserve, and share their ideas: in other words, members of Europe’s educated elite, which really means educated men. With some notable exceptions – for example, our study of the European witch hunts – we will not examine the lives and experiences of premodern women. Likewise, we will learn relatively little about men who were uneducated or otherwise unable to participate in learned culture. Our focus will remain fixed on a tiny slice of European society, a privileged minority who held a disproportionate amount of power and influence and whose ideas, in turn, carried a disproportionate amount of weight. In some respects, these ideas did not affect the average European at all; they were part of an ongoing conversation among the elite members of society that had little relevance to the everyday problems and experiences of most people. In other respects, however, these ideas shaped European society in profound ways that affected almost everyone, sooner or later – including you.

Take a moment to consider the world around you. Unless you are reading this book in the middle of an isolated forest, chances are good that right now your body is bathed in electromagnetic fields, Wi-Fi signals, and the radiation given off by your smartphone as it communicates with the nearest cell tower. As you read this sentence, uncountable numbers of subatomic particles are passing through you, many of them hurtling from outer space. Gravity prevents you from flying off the Earth as it spins at terrifying speeds through the cosmic void, while also acting simultaneously on every other piece of matter in a universe that is incomprehensibly vast. To most of us, this is perfectly ordinary. It is simply the way things are. We accept, virtually without question, that our world is filled with unseen forces and strange phenomena like quantum entanglement and dark energy. Even if most of us don't understand what these are or how they work, we rarely stop to think about them.

In this respect, we are much like the people we will examine in this book. They, too, lived in a world full of unseen and mysterious forces. To them, it was natural and ordinary that the planets they saw in the sky influenced events here on Earth, or that some people could transform lead into gold, or that witches called on demons to help them conjure terrible storms and fatal diseases. Given how premodern people understood their universe, these were rational and sensible explanations for the phenomena that they observed around them. While today we might use different words and theories to describe our universe, for most of us it remains as mysterious and strange as it did to people living a thousand years ago.

This highlights one of the most powerful lessons that history can teach us: that human beings are connected in deep and enduring ways. Even across vast amounts of time, we are, each of us, far more alike than we are different. Another universal similarity is the human drive to ponder some of the biggest and most difficult questions: "Where did everything come from? Why does it exist? What is its purpose? What is *my* purpose?" Throughout human history there have been different systems and philosophies within which people have sought answers to these questions, including the three at the heart of this book: science, religion, and magic. Before going on, let's consider each of these in turn.

Science, as we understand the word now, is a modern invention. Its careful methodology, its well-defined disciplines, its culture of white

coats and laboratories full of sophisticated technology go back perhaps 150 years; in fact, the word “scientist” was coined only in the late nineteenth century. While I have used the word “science” in the title of this book, in the chapters that follow we will focus instead on *natural philosophy*, which was concerned mainly with attempts to understand the natural or physical world. Natural philosophers considered questions like “What makes the heavens move?” or “Why do objects fall downwards?” or “How do plants and animals grow?” Among all the different kinds of knowledge pursued by premodern Europeans, natural philosophy was important but not necessarily preeminent – that honor usually went to *theology*, the study of religion and the divine. This reflects the fact that, while questions considered by natural philosophy usually started with phenomena that one could observe in the world, answers might move beyond the realm of the natural or physical and into the supernatural or the metaphysical. That is one important difference between natural philosophy and modern science, which does not accept supernatural explanations for observed phenomena. Another difference is that, while modern science relies on a single basic methodology that everyone uses, European natural philosophy did not embrace anything approaching a universal method until the eighteenth century. This explains why premodern natural philosophers often arrived at radically different answers to the same question, as we will see in later chapters.

For the most part, natural philosophy was an academic enterprise. It was carried out by the educated classes, whose members shared ideas with one another in settings like Plato’s famous Academy in ancient Athens, in dense tomes written in Latin or Greek or Arabic, or in the universities that sprang up across Europe in the twelfth and thirteenth centuries. By contrast, religion and magic were both practiced by a much broader group of people in Europe. Until the nineteenth and twentieth centuries, most Europeans, regardless of class or income or education, were religious people. They believed in the existence of a supernatural power that created the universe and everything in it, and they were encouraged to live their lives according to moral and ethical principles derived from religious texts, particularly the Christian Bible. Learned and educated people might have approached some religious ideas differently than the average person, but by and large they all believed in the same God. The predominant religion in premodern Europe was Christianity, though throughout its long history there have

always been different interpretations of what “Christianity” means. One important example of these differing interpretations is the Protestant Reformation, which began early in the sixteenth century and led to a permanent split between what became known as the Catholic or Roman Church and various Protestant denominations such as Lutheranism, Anglicanism, and Calvinism.

Importantly, religion had its own role in explaining things that people observed in the world. A question like “Why do objects fall downwards?” could have many possible answers, but if someone believes in a supernatural being who created the universe their answer might be simply, “Because God made things so that they fall downwards.” This isn’t a very *satisfying* answer, though, because it doesn’t help us understand the means whereby things fall. What are the actual forces at work? Do they work the same way everywhere? Can we measure them? Virtually every single premodern European person accepted that the ultimate, final explanation for something that happened in the world was that God made it that way, but much of natural philosophy attempted to answer the more immediate questions about how and why the universe behaved the way that it did. To use the terminology that many premodern scholars employed, God was assumed to be the *final* cause for everything that happened in the universe, but natural philosophers studied the *proximate* or *immediate* causes. A natural philosopher might argue that gravity is the immediate cause for why objects fall downward, while at the same time believing that God created gravity and made it work in this way. Both “gravity” and “God” are answers to the question “Why do objects fall?”, but one – gravity – is closer to us (the proximate or immediate cause) while the other – God – is much further away (the final cause). To complicate things further, premodern people accepted that God exists *above* nature; this is what the word “supernatural” means. As a result, most educated Europeans believed that God existed beyond natural laws and was free to interfere with or suspend those laws at any time. But if this is true, are they really “laws” in the first place? Could someone ever know with certainty that a particular phenomenon they observe in the world is the result of natural processes rather than of supernatural interference? The fact that religion and natural philosophy often proposed different answers to the same questions made understanding the premodern world a complicated endeavor.

Magic, as a concept, is even more difficult to pin down than either natural philosophy or religion. For the first two, we have modern parallels and analogues that, while imperfect, at least give us a foothold as we try to understand what they were in the past. But in modern societies, “magic” has many different meanings, some of them contradictory. Many people today use the term “magic” to describe trickery, fakery, and illusion, as in stage magic where hapless assistants are sawn in half only to reappear, totally unharmed. The audience knows that what they are watching is a trick, and the thrill lies in wondering how the magician did it. At the same time, others use the word “magic” to describe the actual, physical manipulation of the world, such as in works of fiction where the flick of a wand conjures up fire or water or butterbeer, or in real-world traditions like Wicca, whose followers believe that magic can bring good luck, attract wealth, or heal the sick. Someone alive today might explain magic using science and logic – for example, revealing acts of stage magic as optical illusions and clever misdirections – but for others, magic is part of spiritual systems as disparate as Louisiana Voodoo, Nordic shamanism, and LaVeyan Satanism.

In premodern Europe, magic, like religion, was not confined solely to the learned or educated classes. Large numbers of people practiced magic, from soothsayers and healers living in tiny rural communities to university professors and Christian priests who believed they could summon demons or speak with the dead. According to most educated people, magic had a simple definition: the manipulation of hidden forces to produce specific effects. Those forces existed throughout the natural world, and so the task of the magician was to study nature in order to uncover and utilize these forces as part of what they called “natural magic.” For this reason, natural magic and natural philosophy often went hand-in-hand; many natural philosophers believed in the reality of natural magic, and some even practiced it. If philosophy was the means whereby one understood nature, magic was the means whereby one put nature to work.

Not all magic was natural, however. The desperate or the foolish might call on demons to help them manipulate the world and produce whatever effect they desired. Because of their supernatural knowledge of Creation, demons knew better than any human how to manipulate its hidden forces, and many premodern Europeans believed that they sometimes did so – for a price. The learned magician might have the

means to summon and control a demon (the story of Faustus, which we examine in the next chapter, is about one such figure) but for the average person, the possibility of demonic interference posed a far greater threat. From the fourteenth century onward, Europe was gripped by a fever of witch-hunting, a cultural phenomenon during which hundreds of thousands of people were suspected or accused of consorting with demonic powers in order to harm their neighbors and wreak havoc on society. The magic practiced by these supposed witches was demonic in origin and truly wicked in its effects, and religious leaders, theologians, and natural philosophers all stood on the front lines of what they saw as a war waged by the forces of evil against God and His people. Magic, then, was not merely the subject of philosophical inquiry; it was of deep concern to religious institutions as well.

These three realms – natural philosophy, religion, and magic – overlapped with and affected one another in complex ways. None of them existed in isolation; together they gave shape and meaning to the world inhabited by premodern European people. Let's turn now to a very quick description of that world as it existed around the year 1400.

At this point in history the European economy was still focused around agriculture, with most people living and working in rural areas. For many hundreds of years the predominant structure of European society had been defined by *feudalism*, a system of governance and obligation that revolved around the ownership of land. A monarch granted land to members of the aristocracy, and in return demanded fealty and loyalty as well as support in times of war or hardship. These landowners then allowed other people to live on and work their land in return for taxes or other forms of support. As a result, those who worked the land rarely owned it. These people were known as *peasants*, and they made up roughly 60 percent of Europe's population at the beginning of the fifteenth century. This highly stratified and hierarchical system was one of the defining features of medieval Europe.

While a majority of Europeans lived in the countryside in the fourteenth and fifteenth centuries, however, the number of people living in towns and cities also increased steadily during this same period. The founding of the earliest European universities – the first in Bologna in 1088 CE, then Paris around 1150 CE and Oxford in 1167 CE – led to the rapid proliferation of other universities across Europe in the twelfth and thirteenth centuries. Once established, they attracted large

numbers of students to their cities while producing increasingly educated and literate populations. Alongside the rise of skilled trades and an increase in both the production and trade of goods, the spread of universities helped create an urban populace that could aspire to greater wealth, education, and financial security than was possible for most people living in rural villages.

Around 1350 CE, European society experienced one of the most destructive and destabilizing events in its history: the Black Death, a plague that killed as many as 200 million people in Europe and Asia by the year 1353. Historians believe that Europe's entire population was reduced by anywhere between 30 percent and 50 percent in just five years, and the global population did not recover to the levels seen before the Black Death until some three hundred years later. Crowded urban centers were hit especially hard by plague, and as their populations dwindled increasing numbers of people moved away from rural areas and into cities and towns in search of work. This caused population surges in cities across Europe, leading to rapid social and economic changes as the urban workforce diversified into a variety of skilled trades, the cost of manufactured goods went up, and communities of merchants and tradesmen grew in size and wealth. Rural areas that experienced a drop in population, due first to plague and then to the widespread migration into towns and cities, experienced a scarcity of agricultural workers. This led to serious food shortages across Europe. Agricultural land became less valuable because it had fewer people to work it, while labor became more valuable, meaning people could demand higher wages or other forms of compensation. This created a situation that actually favored many who continued to live and work in rural areas. Generally speaking, agricultural workers gained more power in relation to the aristocratic landowners, and eventually this spelled the end of feudalism in most parts of Europe. This in turn led to better living and working conditions for at least some people.

Our narrative, then, begins in the aftermath of the Black Death. Its effects on European society persisted for generations, and at different points in this book we will encounter echoes and traces of those effects: the food shortages and economic uncertainty that contributed to the witch hunts in the fifteenth and sixteenth centuries; the idealism of Renaissance thinkers determined to rebuild a devastated Europe in the image of classical antiquity; and the questioning and challenging of authority that emerged in response to political and social instability.

There are four major themes that will be explored in this book:

1. *The influence of classical antiquity.* Ancient Greece and Rome cast very long shadows across premodern Europe. Attempts to recover classical philosophies, beliefs, and ideas played a central role in defining the cultural movement known as the Renaissance in the fourteenth and fifteenth centuries. By the sixteenth century, however, increasing numbers of educated people sought to correct or dismiss the misconceptions held by ancient writers. These efforts only accelerated in the seventeenth and eighteenth centuries, which were characterized by widespread and deliberate efforts to discard classical philosophies. Whether embracing or rejecting classical antiquity, however, there is no question that the ancient world had a profound effect on European intellectual life.
2. *The relationship between God and nature.* Throughout the history of Christian Europe, the study of nature was tied inextricably to questions about God. Most Europeans believed that the natural world represented an important means of understanding God as Creator; some even referred to the physical universe as the Book of Nature, a metaphorical text that contained crucial knowledge about the divine. Before the eighteenth century most people would have found it unthinkable to separate God from nature, which means that “scientific” inquiry often had religious implications.
3. *The problem of occult or hidden causes.* Premodern Europeans lived in a world in which there might be several possible causes behind the phenomena they observed, ranging from natural forces or properties to demons, angels, and even God Himself. Determining which causes operated in a given situation was not an idle concern, however. Failing to recognize demonic ploys could result in eternal damnation, and attributing particular effects to Nature rather than to God might lead to skepticism or atheism. This is one reason why beliefs and practices that depended on the deliberate manipulation of hidden forces, such as alchemy or magic, inspired suspicion and distrust.
4. *The interconnectedness of the premodern world.* Most Europeans, whether educated or not, saw themselves as part of a small but richly interconnected universe in which the individual was a reflection of both the world around themselves and its Creator. To study one of them was to study the others, and knowing more about the

world also meant knowing more about oneself. This interconnect-
edness is one reason why people invested significant meaning in the
answers to even the smallest questions.

The rest of this book explores these themes in different ways. We will
proceed chronologically, starting at the height of the Renaissance in the
fifteenth century and ending with the Enlightenment in the eighteenth
century. Each chapter presents different facets of the complex relation-
ship between magic, natural philosophy, and religion, though the
examples and individuals we will encounter are by no means the only
ones worth knowing. Instead, each chapter presents a snapshot of a
much larger picture, all of them connected by the themes at the heart of
this narrative.

Chapter 1 explores the realm of “learned magic,” a term coined by
historians to describe a set of magical traditions and philosophies with
roots in the philosophies of classical antiquity. Some of these tradi-
tions, like *hermeticism*, were first encountered by Renaissance scholars
trying to recover traces of the “golden age” of ancient Greece and
Rome. Others, like the Judaic tradition of the *Kabbalah*, had already
existed in Europe for hundreds of years but received closer attention
from Christian writers and philosophers in the fifteenth and sixteenth
centuries as they searched for new and more powerful ways of under-
standing their universe.

In Chapter 2 we contrast the practices of “learned magic” with the
brutal witch hunts that spread across Europe for hundreds of years,
events driven in part by fears and misunderstandings about popular or
folk magic. Tens of thousands of men, women, and children were
killed as part of the hunts, which mark a profound turning point in
European ideas about magic. This also represents an important
moment in European religious history, solidifying the power and pre-
rogative of the religious authorities to define ideas and beliefs as
heretical, or violating the teachings of Christian orthodoxy.

Chapter 3 also touches on magic, but this time in the context of
medicine. We examine how premodern Europeans practiced medicine,
including the many ways in which the wider universe was believed to
affect the human body. Physicians and other medical practitioners
commonly resorted to astrology in order to diagnose and treat their
patients, and the fundamental idea of magic – the belief that the world
contains hidden forces and powers that can be harnessed to accomplish

specific tasks – was seen as a powerful tool in the arsenal of some medical practitioners. One such practitioner was the infamous medical reformer Paracelsus (1493–1541) who, in the early decades of the sixteenth century, combined a respect for nature’s secrets with a deep reverence for God in his efforts to create an entirely new way of healing.

The central role of religion in European life is a major part of Chapter 4, which explores how a small number of philosophers and mathematicians changed how people understood the cosmos. The long-standing idea of an Earth-centered universe was challenged first by the groundbreaking work of Nicolaus Copernicus (1473–1543) in the sixteenth century and then by the fiery arguments of Galileo Galilei (1564–1642) some sixty years later. After claiming that the Earth moved, Galileo was placed on trial by the Catholic Church, but while this moment in history is often used to illustrate the incompatibility of science and religion, we take a closer look at the debate in an attempt to understand the motivations and anxieties driving both sides.

Galileo’s trial had a profound impact on how early modern philosophers talked about God, and in Chapter 5 we see how this affected the *mechanical philosophies of nature*, which attempted to explain natural phenomena as the motion of tiny pieces of matter. The mechanical philosophies first took shape in the first half of the seventeenth century, and they presented the educated classes with serious questions about the presence and role of God in the physical world. We follow two different mechanical philosophers, Pierre Gassendi (1592–1655) and René Descartes (1596–1650), as they sought to create systematic and useful ways of studying nature while also preserving a role for divine activity. In doing so, they created new ways of thinking that inspired later generations of scholars but also raised deep and uncomfortable questions about God, the human soul, and life itself.

Chapter 6 tackles the problem of experience, which was a central part of the “new science” that emerged in the latter half of the seventeenth century. Descending from the mechanical philosophies of Gassendi and Descartes as well as the methodology pioneered by the English philosopher Francis Bacon (1561–1626), the “new science” had as its earliest advocates virtuosi like Robert Boyle (1627–91), John Locke (1632–1704), Gottfried Leibniz (1646–1716), and Isaac Newton (1642–1727). Empiricism and experimentation both became important elements of this new approach to the study of nature, but

these practices also posed particular difficulties for early modern thinkers. We examine those difficulties by looking more carefully at the theory and practice of alchemy, which was an experimental “science” in its own right but which slowly underwent a profound and lasting change in the early eighteenth century. Some practitioners of the “new science” eventually went to great lengths to separate problematic alchemical ideas from what they defined as the emerging science of “chemistry.”

The slow demise of alchemy as a respectable field of study leads us into Chapter 7, which takes stock of the changed world in which European people now found themselves. This was the dawn of the Enlightenment, the sweeping cultural and intellectual movement that many historians see as the beginning of the modern West. Enlightenment thinkers called for the radical separation of religion from public life, championed rationality, and heaped scorn on the superstitions of the uneducated. The careful, sometimes precarious balance between science, magic, and religion that had survived for centuries collapsed into something that is more familiar to many of us today, with consequences that are worth considering.