Renaissance Science

The Path to Enlightenment

Many people have a very western-based perspective of the history of science, a view drawn from looking at the world around us and seeing the innovations that arose in Europe and North America. In one fell swoop, older history books drew a line between the Ancient Greeks and modern science, believing that the contributions of other parts of the world were minimal.

Of course, historians now know that this is not true and that other civilizations and other parts of the world made significant contributions to the history of science. The Mesopotamians, Egyptians, Indians, Maya, and Chinese all played a considerable part, and Islam preserved the knowledge of the ancients, adding further insights and conclusions. With the veneer of modern cultural arrogance stripped away, we can see that knowledge is not the preserve of the West and that most modern scientists owe a great debt to earlier peoples. This Euro-Centric view sprang from the Renaissance Era in Europe, a time when great scientific advances were made and science as we know it started to take shape. Instead of the polymaths of Ancient Greece and the Middle East, we started to break science into disciplines, and medicine, astronomy, natural science, physics and many other fields took on forms that are recognizable today.

When Was the Renaissance?

Map of the Italian Renaissance

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Map of the Italian Renaissance (Public Domain)

Defining when the Renaissance occurred is tricky; historians used to label the period of history after the fall of Rome the Dark Ages, largely due to the lack of written evidence leading them to believe that no progress occurred. Of course, we now know that the Islamic Golden Age made advances, and even Europe still had some great minds, such as Roger Bacon and Gerbert of Aurillac, and universities sprang up across the continent. As a result, this period of time is now called the Middle Ages and it blurs seamlessly into the Renaissance. There was a period of intellectual revival from 12th century onwards, but this was interrupted by the infamous Black Death of the mid 14th century, which killed between 30 and 50% of Europe's population and saw people increasingly begin to migrate for work. Arbitrarily, the European Renaissance is given the date 1450 CE as its starting point, as the time when European thinkers began to receive information and knowledge from outside Europe. The Ottomans sacked Byzantine Constantinople, in 1453, causing many scholars to flee to Europe, bringing texts and knowledge with them. In Spain, unrest and change in the constant battle between the Moors and the Christians saw many academics flee to Europe, landing in the great Italian city-states of Florence and Padua, amongst others. These acted as the nucleus for a revival in learning, adding to the system of religious academies set up by Charlemagne (742-814), which had once again encouraged academics to look at how the universe works, both physically and metaphysically. Determining when the Renaissance ended is a much more difficult process, because it blended into the Enlightenment over a period of decades. Long after the Renaissance ended, its influence in art and architecture remained and this applies equally to science. It is perhaps easier to describe the end of the Renaissance period for the different scientific disciplines although, naturally, these are still arbitrary and based upon a particular landmark, such as Newtonian mechanics or the invention of the microscope. As a rough guide, most historians accept that the second half of the 17th century saw the transition from the Renaissance into the Enlightenment.

The Importance of Art

Although this is a science site, the history of science of the Renaissance must draw from art, because much of the drive behind the rise of academia lay with such artists as Giotto, Donatello and Michelangelo, men who tried to recapture the perceived perfection of the classical times, recreating the artistry of the Greeks and the Romans. They looked backwards for inspiration and tried to emulate the perfection they saw in the ancient statues.

Da Vinci View of a Skull

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View of a Skull, by Da Vinci
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This connection between art and science may seem a little strange to modern observers, but the Renaissance art and architecture incorporated mathematics and precision into every piece. Artists and scholars resurrected the Ancient Greek belief that creation was built around perfect laws and reasoning, believing that the artist could capture some of this flawlessness. It is even possible to tie religion in with this, because many of the artists were drawn towards religious art and subjects, with churches and the other great cathedrals distilling architectural [1] knowledge. While European Christianity and science often conflicted with each other, it is fair to say that it also had positive effects, in much the same way that the instruction to understand creation underpinned the Islamic Golden Age. Some scholars refer to the Renaissance as the age of observation, where scholars began to dissect and study the smallest things in an attempt to find scientific truth. For example, artists, partly fuelled by the needs of the artist for realism in their paintings and sculptures, began to dissect cadavers and animals, with Leonardo Da Vinci's combination of art and science a fine example of this. Architects rediscovered the mathematical laws formulated by the Egyptians, Greeks and Romans, building huge edifices and structures on classical principles. They believed, as did the Greeks, that certain mathematical ratios used during the design of buildings would result in aesthetically pleasing and strong structures; the fact that many have survived to this day, despite natural disasters and war, is a testimony to the skill of the architects and builders.

The Renaissance and Philosophy

Steno's Dissertation

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Steno's Dissertation (Public Domain)

Looking at the history of science in the Renaissance also touches upon philosophy, as the European thinkers began to question the metaphysical aspects of creation. Discussing the work of the Renaissance philosophers fills entire books, so we can only touch upon the subject here! The great minds, such as Newton [2], Leibniz, Descartes, and Francis Bacon were all fundamental architects of the history of science, but they also contributed to philosophy, their metaphysical and theological beliefs also defining their work. Perhaps the greatest shift in philosophy during this period is from scholastic and theological thought towards empiricism, the first sign of a split between science and religion and the recognition that they are two separate fields; the repercussions of this schism are still apparent today. Copernicus (1473-1543) had a well-documented dispute with the church, concerning his idea that the earth moved around the sun. The astronomer, Galileo [3], and geologists such as Gessner and Steno [4], ran into similar conflicts, and Newton appeared reluctant to publish some of his findings where they conflicted with church doctrine. Strangely, a strange dualism defined the Renaissance: Many scholars found sponsorship by the church, while others found their findings suppressed or their study tainted by accusations of demonology and witchcraft. Undoubtedly, aided by the Reformation and Counter-Reformation, the grip of Church doctrine on science loosened during the Renaissance. Ultimately, this provided the foundation for the Age of Enlightenment to blossom against a backdrop of revolution and conflict in Europe as the old ways gave way to the new. Certainly, most historians would not argue with the view

that the Renaissance was the transformation period between the ancient world and the modern, the crucial period in history that set us on our current path, in art, literature, politics, science, and architecture.

Links
[1] https://staging.explorable.com/renaissance-architecture
[2] https://staging.explorable.com/isaac-newton
[3] https://staging.explorable.com/galileo-galilei
[4] https://staging.explorable.com/renaissance-geology-2