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Important Discoveries in Astronomy

The curiosity of mankind is at the root of science and our progress into the future. Our ability as humans to question what we observe around us and make sense of it is crucial in putting us in the top spot as the dominant species on our planet. While developing tools and conducting experiments with things that we can inspect up close, humans have always looked up at the vast array of countless stars and planets turning in the sky above in equal wonder. Though discoveries in astronomy tend to seem distant and unrelated to humans living here on Earth, they change our understanding of our place in the universe. These discoveries also often help us to develop tools and technology that are useful to everyone.

Because every great scientist relies on the discoveries of those who came before, it is important to acknowledge that there is not one, singular great discovery, but many that flow into one another. Thus, the fact that Sir Isaac Newton, who is widely regarded as one of the most influential scientists of all time, or the modern and popularized Stephen Hawking are not discussed at great length does not mean that their work is not of great importance. However, for the sake of brevity, only three significant “astronomical” discoveries will be outlined here. Without these three discoveries in astronomy, we would have a vastly different view of our universe and our place in it.

In our modern era, the mention of astronomy brings to mind our spherical planet spiraling around the sun as one of a family of planets that are a part of our solar system. Few today would dare to argue the reality of this accepted model of our solar system. However, there was a time when the people of our planet were quite certain that the earth was the center of the universe. Though Nicolaus Copernicus is famous for putting forth the heliocentric model in 1543, it had been proposed before. Aristarchus of Samos had suggested the idea between 310 BCE and 230 CE ("Aristarchus of Samos, the Ancient Copernicus. (Reprint, 1913)."). Such an idea, however, was useless in a world with overwhelming opposition to it. The Greek astronomers universally accepted the geocentric model with our planet at the center of everything. As previously mentioned, all great scientific discoveries are built on the work of many scientists before. Copernicus was able to provide the math to show that the heliocentric model was viable, but it wasn't until the observations of Galileo Galilei that anyone was able to compile sufficient evidence to convince a great number of people that our planet orbits the sun. This is now an indisputable fact. Without the heliocentric model becoming widely accepted through Galileo's work and observations, astronomy as we know it could not exist. Furthermore, Galileo would not likely have come to be known as the "Father of Observational Astronomy".

The next contribution to astronomy to be discussed in this paper was by the famous Albert Einstein. In the South Bend Tribune, it is stated well that "What [Einstein] wound up doing was to overturn laws of motion that had been accepted since the days of Galileo and to reject the existence of an all-pervading, universal "ether" which went back even further, to the ancient Greek philosopher Aristotle" (Rumbach). Thinking about how long the ideas of Aristotle and Galileo were in place helps to put into perspective the immensity of Einstein's discoveries.

Einstein is responsible for multitudinous discoveries in science, many of which have an impact on modern peoples' lives each day. He discovered photons, uncovering mysteries of the properties of light. Without some of his work in this area, we may not have televisions or any devices with screens on them. His famous equation, $E=mc^2$, showed the connection between mass and energy which allowed humans to harness the power of nuclear energy. Einstein is the creator of the Theory of Special Relativity and Theory of General Relativity, which both still bend the minds of people everywhere (Gangui). These relate space, time, the speed of light, and gravity into a theory that is observable by scientists today. The major catch is that these theories of relativity break down on a tiny quantum scale, leaving the door open for someone to uncover a unified theory to encompass both the most massive, as well as the tiniest known things in our universe.

Another huge discovery in astronomy was made in the 1920s by Edwin Hubble. Hubble was able to observe the other galaxies moving away from us proving the rapid expansion of the universe. He was able to then make an approximate calculation of the age of the universe (*Edwin Hubble*). The idea that the universe is expanding supports the well-known Big Bang Theory. The Big Bang remains as only a theory, but Hubble's observing the expansion of our universe only increases support for the theory in a way similar to how Galileo's observations got the people on board with heliocentrism. This shows how much of an impact Hubble's discovery had on the astronomy community.

Together, these huge milestone discoveries from some of the brightest minds in science have changed our view of the universe. Without them, our knowledge of our place in the universe would be dramatically different. In some ways, our daily life would be changed more

than most people may realize.

Works Cited

- "Aristarchus of Samos, the Ancient Copernicus. (Reprint, 1913)." *Scitech Book News*, vol. 29, no. 1, 03, 2005. *ProQuest*,
<https://search-proquest-com.uaptc.idm.oclc.org/docview/200134750?accountid=39906>.
- Edwin Hubble*. ProQuest, Ann Arbor, 2018. *ProQuest*,
<https://search-proquest-com.uaptc.idm.oclc.org/docview/1959818434?accountid=39906>.
- Gangui, Alejandro. *El Universo De Einstein: 1905 - Annus Mirabilis - 2005*. Cornell University Library, arXiv.org, Ithaca, 2007. *ProQuest*,
<https://search-proquest-com.uaptc.idm.oclc.org/docview/2092469355?accountid=39906>.
- Rumbach, David. "Mental Giant ; His Theory may be a Century Old, but Einstein Still Boggles the Mind." *South Bend Tribune*, Feb 04, 2005, pp. 1. *ProQuest*,
<https://search-proquest-com.uaptc.idm.oclc.org/docview/417299313?accountid=39906>.