

between the rural and urban, agricultural production and industrial production, scientific developments and periods when science does not touch people's lives. However, it is necessary to mention that daily practices are not open to dichotomy as such, that there are intermediate or transition forms and there could be elements of the city within the rural and elements of the rural within the city. For example, the ghettoization of some communities from a certain section in the city provides the opportunity for continuation of customs and traditions decorated with religion from the rural. Or, there may be many opportunities available in the rural area similar to the city as a result of developed networks and technology.

What needs to be emphasized here is the main story that reveals the direction of change even though there are no such sharp dichotomies in daily practices. Therefore, these are the questions that need to be asked: Do scientific developments impact life more or less in comparison to the past? Or, is industrial capitalism which operates with market dynamics more dominant now than in the past? For which generations have cities become the center of life? Of course, urbanization does not mean that all the components of the city are or will be part of the same culture or lifestyle, as argued later in this thesis. During social changes, while a section of society moves in one direction, the other part may be moving elsewhere. The thing we call transformation is a new form (Yılmaz, 2012) provided to society by the total change formed during these movements. Consequently, even though sharp dichotomies exist below, it needs to be emphasized that life practices are not separated from each other in such clear lines.

## **THE ROLE OF THE NATURAL SCIENCES IN THE SECULARIZATION PROCESS**

Partly as a result of the Scientific Revolution of the 17<sup>th</sup> century and its successor, the Enlightenment of the 18<sup>th</sup> century, the fields of natural sciences and theology (ideology of the Church in those

times) have since largely been treated as mutually exclusive, particularly in Western literature. The new ideas that came to light with the Scientific Revolution provided philosophers of the Enlightenment with ammunition in their wars against the Church and its ideology, theology. Since then, numerous works have asserted that theology, the Church, the clergy, and religion generally have lost their powers in the light of new scientific discoveries (Bernard, 1938; Goldmann, 1968; Crocker, 1969; Easlea, 1980; Eze, 2002; Jones, 2009).

In the first place it must be stated that the Catholic Church (The Church) and religion are not the same thing and as concepts they should not be used interchangeably. The Church belongs to the world of Christianity and there are religious systems without a church-like organization. However, in the European context, especially in the Middle Ages, the Church did not only serve as a religious space where people worshipped. It was a powerful institution both in the political and intellectual sense. The Church was an institution that directly participated in wars, granted titles to monarchs, established universities, stepping, in a way, in all the spheres of life. For this reason, the Church was not only a worship place for Europeans, but it was an active representative of that religion (i.e. of Christianity) and it wanted to concern itself with each and every sphere of life. The clergy did not only consist of religious leaders who solely had a mediator role between the Creator and its servants, but at the same time they were mighty and divine characters in the regions they served. Theology, on the other hand, was not only an academic discipline, but also the ideology of the Church.

For this reason, taking a closer look at the European history we would see that religion (Christianity), the Church, the religious leaders (the clergy) and theology were intertwined, especially in the Middle Ages. In such an environment, an advantage or loss of one of these actors was automatically also attributed to the others. For instance, when a claim of the theology as the ideological column of the Church was disproved by natural sciences, it was not only a blow

to the prestige of the Church naturally. In this case the religion, of which the Church was the representative, and the clergy, that served to spread the theological arguments, were also substantially hit in terms of prestige. It was in the modern time that the religion, the Church and theology entered into a path where they got separated from each other. For this reason, below I will advocate the argument that the changes inspired by the natural sciences have dealt a blow to the prestige and power of the Church, theology and indirectly to the religion due to the close association of them in pre-modern Europe.

Although it is an undeniable fact that the Scientific Revolution became a vital pillar of the European secularization process, taking a closer look at this historical phenomenon, as Bruce neatly explains, it is not possible to claim a zero-sum relationship between scientific advances and the belief in religion:

(...) many seventeenth-century Protestant scientists were inspired to natural science by a desire to demonstrate the glory of God's creation, by the rationalizing attitude of the Protestant ethic and by an interest in controlling the corrupt world. The end result was the same irony that followed from the general rationalization of ethics. Because the Puritan scientists were able to demonstrate the fundamental rule-governed nature of the material world, they made it possible for subsequent generations to do science without topping and tailing their work with the assertion that "This shows God's glory". At any stage in the growth of knowledge, God could be summoned to fill a gap. Newton, for example, believed God periodically took a hand in the movement of the planets to rectify a slight irregularity (2002: 27).

Indeed, as history has shown, a religious man can be a scientist and a scientist can be religious. Stark & Finke (2000) and many other sociologists of religion claim that such cases expose the failure of secularization theory. For them, secularization theory should be sent to the graveyard of failed theories since there are many scientists who believe in God, just as there are many religious people in the modern world who occupy themselves with scientific research.

However, according to Bruce (2002: 26-28), the contribution of scientific developments to secularization cannot be reduced to the notion of mutual exclusion of two spheres, namely, that religion cannot survive if there is development in natural sciences or that natural science cannot be advanced if religion remains dominant. No doubt, to the extent that scientific developments penetrate into daily life, the secularization process will continue to accelerate. But it should be stressed that the effect of scientific advances on the secularization process is not a direct effect, but rather an indirect one. If a pious man is busy with scientific research or a scientist believes in religion, this does not create any problem in terms of validity of the theory (Bruce, 2002: 106-117).

In light of the above discussion, this section has two main objectives. First, to explain the historical origins of the dominant, yet inaccurate notion of a zero-sum relationship between natural science and religion in light of Bruce's works. Second, to indicate that the role of natural sciences in the secularization process does not depend on the history or geography of any particular region, which means that the vital role of scientific advances in the secularization process is not unique to the history of Europe and its offshoots across the world.

### **Origins of the Inaccurate Notion of a Zero-Sum Relationship**

By the 16th century, Catholic theology had been one of the reliable ways of accessing knowledge. Unlike today, the Catholic Church and other religious institutions had the authority and power to touch upon every corner of life: education, health, politics, diplomacy, marriage, birth and death. In like manner, scientific methods and studies were not exempt from the interference of self-reliant theology and all-powerful religious authorities. Many questions, which might be clustered under the title of natural science, were answered by theology without demur. For example, very clear and incontestable answers were searched in sacred texts and/or given by

clergy to questions such as: “How was the Earth created? When was it created? What is the substance of planets rotating in outer space? Are there other creatures somewhere out there in space? Do the sun and the moon move? What is the hierarchical order of animals?” Especially after the translation of Aristotle’s works from Arabic and Greek into Latin, Aristotle’s physics, cosmology, mathematics and logic were accepted by the Catholic Church as unquestionable sacred knowledge (Harman, 1983: 4-5).

For example, according to the Aristotle-based Church teaching, the Earth was at the centre of the universe and its shape was circular as a symbol of perfection. All other heavenly bodies, including the Moon and the Sun, were moving around the Earth in circular motion. All things found between the Earth and the Moon were open to transformation. However, the things above the Moon were seen as perfect and immune from any alteration. In Aristotle’s philosophy, unchangeability denotes faultlessness. While the *aether* was seen as the substance of perfect region (supralunar), the main substances of the imperfect terrestrial sphere (sublunar) were air, water, fire, and earth (Koestler, 1990; Shapin, 1996: 22-23).

The ongoing quasi-hostility between natural science and theology began with the scientific refutation of Aristotle-based Church claims about the universe. For instance, Copernicus (1473-1543) objected to the idea that the Earth is at the centre of the universe. His hypothesis was that the Sun, not the Earth, is at the centre; the Earth revolves in a yearly period around the Sun while it rotates daily on its axis; not only the Earth but other planets as well revolve around the Sun. In this way, claims held to be unquestionable by the Church for centuries were directly challenged by Copernicus. Then, Kepler (1571-1630) argued that the laws governing planetary motions were different from what they had been thought to be. After studying the orbit of Mars, Kepler claimed that the Earth and other planets do not move in a circular motion around the Sun, but in an ellipse. But the fatal blow came from an Italian astronomer by the

name of Galileo Galilei (1564-1642). He observed that the Sun's black spots were constantly changing in terms of their number and shape. That observation by Galilei spelled the end of an era, for it profoundly violated the Church's claims based on Aristotle's physics (Harman, 1983; Shapin, 1996).

Up until the 17<sup>th</sup> century, theology had been respected and rarely questioned as one of the reliable methods for accessing knowledge. Claims of the natural sciences were supported not to contradict the Church's doctrines. However, the accuracy of the Copernican system was not revealed by looking at sacred texts, but through observation made by Galilei. Newton's laws of motion reinforced the superiority of scientific knowledge over the authority of the Church at the end of the 17<sup>th</sup> century. Thenceforth, the authority of the Church, which had already been shaken by the Protestant Reformation in matters of theology, was shattered.

The Scientific Revolution that began with Copernicus, Kepler, Galileo and Newton did not only change the human perspective on nature, but also the method of obtaining data. Along with Francis Bacon and René Descartes, collecting materials, making observations, carrying out experiments, and reaching conclusions based on evidence became the main scientific method at the expense of relying on sacred religious texts (Tierney, Kagan and Williams, 1992). While man had been placed at the centre according to the Christian Genesis, the new planets discovered by Galileo's telescope revealed the possibility of other worlds and creatures.

For one thing, these discoveries cast serious doubts on the anthropocentric world view of the Church.<sup>25</sup> In time, some of the most well-known religious claims about the universe and history completely lost their validity. Scientists proved beyond doubt that the Earth was much older than had been claimed by the Church. Biblical assertions such as "the world also shall be stable, that it be

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25 "Any view magnifying the importance of human beings in the cosmos, e.g. by seeing it as created for our benefit" (Blackburn, 2005: 18).

not moved” (King James Version, 1 Chronicles 16:30) was soundly refuted. The understanding of a limited universe preached by the clergy was replaced by the perception of a universe that is infinite. In addition, not only did the ideology of the Church, i.e. theology, lose power and prestige due to advances in natural sciences, other spiritual thoughts, superstitious beliefs in miracles, and alchemy (miracle drugs, magic potions) also lost their prestige. Supranatural claims about the universe were replaced by knowledge obtained via secular methods. As a result, fewer people continued to pay attention to astrology, treatment with magic, or witchcraft and the visibility of these supranatural phenomena in society dwindled in time (Perry *et al.*, 1989).

After all these developments in natural sciences that successfully refuted the main claims of theology, 17<sup>th</sup> and 18<sup>th</sup> centuries Enlightenment philosophers and scientists added to the fire by producing many works that were outrightly hostile to those aspects of theology, if not religion itself, that were not coherent with reason.<sup>26</sup> For example, Comte de Buffon, an accomplished mathematician and biologist, argued that the Earth must be older than it said in the Bible. Like Buffon, the Scottish geologist James Hutton suggested that the Earth was older than 6000 years by commenting on the perpetual erosion of mountains (Tobin & Dusheck, 2005: 303).

The ongoing debates between Enlightenment thinkers and the clergy throughout the 18<sup>th</sup> century (Hayes, 1919: 413-14) and the exciting quarrels between 19<sup>th</sup> century religious leaders and ardent defenders of Darwinism (Turner, 1978: 356-57; Bruce, 2002) helped to disseminate the perception of a zero-sum relationship in which the gain or loss of the Church/theology/clergy is balanced

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26 Spinoza in his *the Tractatus Theologico-Politicus* (1670), John Toland in his *Christianitatem Not Mysteriosam* (1696), Montesquieu in his *Persian Letters* (1721), Voltaire in his *English Letters* (1734), and *Philosophical Dictionary* (1764), Edward Gibbon in his *Decline and Fall of the Roman Empire* (1776-89), David Hume in his *Dialogues Concerning Natural Religion* (1779), Kant in his *Critique of Pure Reason* (1781) and *Religion within the Bounds of Bare Reason* (1793), etc..

in an appropriate manner by the losses or gains of secular domains. Indeed, Enlightenment thinkers believed that the more natural science would become pervasive, the less Catholic theology, Catholicism and the clergy would find a habitat for themselves; by the end of the day, religion would vanish due to scientific progress. In 1710, Thomas Woolston argued that Christianity would vanish by the beginning of the 20<sup>th</sup> century. Likewise, the French philosopher, Voltaire, heralded the annihilation of religion within 50 years in a letter to Friedrich II of Prussia (Stark, 1999: 249). Hostility towards religion, theology and the clergy had almost become the prerequisite of being an intellectual during the Enlightenment. Prophets of the monotheistic religions were called charlatans, while religious beliefs, following classic atheist discourse, were seen as the expression of fear (Redwood, 1976: 34; Norris & Inglehart, 2008).

The founding fathers of sociology joined the Enlightenment philosophers who believed that rational thought and scientific knowledge are capable of occupying almost every field that was previously under the hegemony of theology. The alleged zero-sum relationship between natural sciences and theology of the 18<sup>th</sup> century was maintained by Saint-Simon (1760-1825) and Comte (1798-1857) in the 19<sup>th</sup> century. Saint-Simon believed that there would be no need for religious men at the final stage of humanity, and that all supranatural beliefs and superstitions would be completely disregarded in the not-too-distant future. For him, religion or men of religion would inevitably lose out to scientists, artists, intellectuals and industrialists (Simon, 1956: 320-21). Like Saint-Simon, Comte (1998: 41) thought that religion would totally disappear in the new world as a result of scientific progress. Some scientific developments at the time, like analysing water and air, the discovery of oxygen, new information related to blood circulation, significant improvements in light, the universal law of gravity, *etc.* convinced him that in the near future people would rely only on scientists and industrialists.

If we go back to the founders of sociology, it is fairly common to come across thinkers who argued that scientific developments would render religious discourses invalid, and that neither god nor religion would have any chance of survival in the foreseeable future. However, such an idea or claim has not been defended or recognized by the classic theory of secularization. That theory has been fervently discussed after the 1960s, and encountering classical secularization theorists who defend that religion will vanish with the advancements of natural science have become the exception rather than the norm. Berger (1967b), who defended a classical version of the theory in the 1960s, built his theory on pluralism, not on natural science. Likewise, when Wilson (1966) tried to explain the theory, he asserted that the coexistence of religion and natural science does not pose a problem at all for the theory. As one of the best-known proponents of the secularization theory, Bruce (1996: 48-49; 2002) explains quite clearly and comprehensively, that the so-called zero-sum relationship has no place in the theory. Working parallel to these authors, other scholars such as Chaves (1994), Dobbelaere (1985), Davie (1994), Luckmann (1967), Martin (1965; 1978) and Fenn (1969) have not supported the notion that scientific advances have a direct impact on the secularization process.

Sociological explanation, by its very nature, is not interested in or concerned with conflicts between two different ideas or concepts. What is important for sociology is the social impact of those ideas. The battle between the claims of natural sciences and the claims of theology could be zero-sum on a theoretical level. The claims, findings or doctrines of one may be rejected or refuted by the other. But if there is no social response to this battle, in other words, if there are those who define themselves as religious while engaging with science, the zero-sum relationship on the theoretical level does not make much empirical sense for the discipline of sociology. Today, while many modern communities are experiencing a process of change from an industrial society to a knowledge-based society,

many religious people are still engaged in scientific experiments in their laboratories. Regardless of the fact that science has permeated every area of life, there are countless people who still believe in theology and are still practicing the rituals of their religion in modern countries. Therefore, to posit that religion and natural science have a zero-sum relationship in daily life just because of the quarrel between theology and natural science is not consistent with the facts of life.

So, if scientific developments do not undermine religiosity, and if natural science and religion continue to co-exist, how then is the secularization process accelerated by scientific advances?

### **The Role of Scientific Developments in the Secularization Process**

The contribution of scientific advances to the secularization process seems to have taken place not directly, but indirectly. Scientific developments lead to secularization in two indirect ways. Firstly, they increase the level of human rational consciousness. Secondly, the proliferation of technology reduces the number of cases where religion touches upon the lives of people. I will discuss these two points in greater detail below.

#### *Rational Consciousness and Secularization*

The concept of rational consciousness refers to conceiving natural phenomena in the worldly cause-effect relationship, and not having tendency to use supranaturalism to explain them (Morrison, 1995: 42). Weber calls this “the disenchantment of the world”. To him, humans began to conceive worldly events in light of observable facts due to the scientific progress. Science accelerated the collapse of enigmatic structures in the universe filled with magic, mystery and unknowable “facts” (Hughes, Martin and Sharrock, 1995: 120-21). As for the origins of natural phenomena, human technical knowledge, the ability to calculate and observe, and the natural human de-

sire to take more control of nature have resulted in fewer references to “metaphysics”.

Throughout the ages, when scientific advances had yet to penetrate radically into society, natural events such as solar eclipse, lunar eclipse, comets, incurable infectious diseases, and quite a number of deaths from devastating calamities like floods, earthquakes, and droughts had all been conceived as messages from the gods. While the sun was the symbol of justice and righteousness among the Sumerians, it was worshipped as a god in ancient Egypt. In the olden days, people tried to create various noises using pots and pans to ward off evil spirits during solar eclipses. The Halys War in 585 BC between the Lydians and the Medans was ended thanks to a solar eclipse which was seen by the warring parties as a message from the gods to end the fighting (Worthen, 1997, May). Abundant harvest and rain, victory in battle and a safe return of the marines were ensured by the gods of Romans (Bagnall, 2002: 16). Trying to understand whether the gods supported the army by looking at the amount of chicken’s grain (Dillon & Garland, 2005: 189), attributing the loss of battle to lunar and solar eclipses (Leick, 2010: 28), ending wars, cancelling a planned invasion, or postponing retreat from war because of a solar or lunar eclipse, and deciding or not deciding to attack because of comets (Scheckel, 2013: 132), are historical examples that indicate how “metaphysics” could easily interfere even in very important and influential historical events.



**Picture A1.** Halley’s comet was depicted as a portent of doom in the Bayeux Tapestry (BBC, 2013, March 15)

However, with the advent of scientific tools and observations, the solar eclipse, which had been conceived of as a message from supranatural powers, is currently taught in all educational institutions as a natural phenomenon that occurs when the Moon passes between the Earth and the Sun. In this day and age, it is possible to know with great precision when, in terms of hour and seconds, and where, in terms of visibility from the surface of the Earth, the next solar eclipse(s) will take place. Moreover, comets are now known to be a combination of water, frozen gases and cosmic dust. There are too many of them to be counted and while the trajectories of some can be calculated, it is not possible to make such a calculation for the vast majority of them which move beyond the limits of our solar system (NASA, n.d.).

A similar mental transformation has also taken place with regard to the origin of diseases. Before the discovery of bacteria and the subsequent invention of antibiotics, the causes of many diseases were unknown. All those enigmatic natural phenomena - solar eclipse, comets, diseases with unknown causes - were freed from being considered a mystery and turned into subjects of scientific inquiry. Therefore, the more scientific advances penetrated into daily life (invention) and natural phenomena became subject of natural science (discovery), the more the mechanical worldview of the 18<sup>th</sup> century Enlightenment philosophers was taken seriously.<sup>27</sup> Like a clock, the earth was considered to be self-powered without need of any external influence for it to work. Likewise, the creator turned into a watchmaker who created the Earth and then stopped in-

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27 Although the mechanical worldview became prevalent with industrialization, Francis Bacon, René Descartes and Isaac Newton had already introduced it in Europe in the 17th century. Bacon praised the scientific method based on observation and experiment. Descartes founded analytic geometry and argued that all phenomenon could be explained by mechanical philosophy. And lastly, Newton's famous laws of motion laid the foundation for the mechanical worldview. It should be added that, natural science moved away from mechanism with the theories of evolution and relativity. But still these theories do not support a world designed according to divine laws.

terfering with its mechanism: “The universe was now viewed as a giant machine functioning according to universal laws that could be expressed mathematically; nature could be mastered” (Perry *et al.*, 1989: 385). This idea, which suggested that the creator had created the universe and then retreated, is a result of the mechanization and cause-effect explanations for the origin of natural phenomena. Thus, all those natural phenomena, for which physics and mathematics had not been able to offer any compelling explanation, would remain unknown until scientists were able to solve the mystery. On the other hand, explanations based on metaphysics are not taken into consideration anymore.

As a contemporary example, we can take the self-propelled large rocks of Death Valley, located on the border between California and Nevada:

One of the most interesting mysteries of Death Valley National Park is the sliding stones at Racetrack Playa (a playa is a dry lake bed). These stones can be found on the floor of the playa with long trails behind them. Somehow the stones slide across the playa, cutting a furrow in the sediment as they move. Remarkably, multiple stones commonly show parallel tracks, including apparently synchronous high angle turns and sometimes reversals in travel direction. Some of the stones weigh more than 300 kg. That makes the question: “what powerful force could be moving them?” (Sci-News.com, September 14, 2014)



**Picture A2.** Unexplained Earth Phenomenon: The Moving Rocks in Death Valley National Park (Strange Sounds, 2012, December 4)

The mystery behind their movement had not been solved until recently. With hundreds of pounds in weight, and although starting at the same place, they each drag through different directions without any visible force. Many metaphysical explanations such as the devil, who is responsible for the grains of sand, or aliens who are responsible for the movements of these rocks, had already been offered for this quite interesting and exciting natural phenomenon. However, NASA scientists, Ralph Lorenz *et al.*, put forth a very plausible answer to this unsolved mystery while they were making a comparative study of Death Valley's meteorology and a hydrocarbon lake on Saturn's moon, Titan. Lorenz *et al.* (2011: 2374) argued that heavy rocks were moving in different directions since the mass under the earth turns into ice in extreme cold and this ice mass influences the Earth's surface. However, the explanation by Lorenz *et al.* has already been falsified in 2014 by further research. A weather station adjacent to Death Valley was set up and a number of time lapse camera systems were used to overlook the southeast corner of the *playa* in the Valley, and fifteen GPS-instrumented rocks on the *playa* surface (Norris, Norris, Lorenz, Ray & Jackson, 2014). Norris *et al.* visited the dry lake several times in a year to exchange battery packs and download weather data. Conditions were recorded hourly from November to March each year via the time lapse cameras in which exposures are taken at fewer intervals than usual. This allowed researchers to view a naturally slow process at an accelerated pace on playback. By the end of the day, they succeeded to solve the mystery of Death Valley's moving stones. Here is the mystery behind the moving rocks:

First, the *playa* fills with water, which must be deep enough to form floating ice during cold winter nights but shallow enough to expose the stones. As night-time temperatures plummet, the pond freezes to form thin sheets of 'windowpane' ice, which must be thin enough to move freely but thick enough to maintain strength. On sunny days, the ice begins to melt and break up into large floating panels, which light winds drive across the *playa*, pushing rocks in front of

them and leaving trails in the soft mud below the surface (Sci-News.com, 2014, September 14).

At present time, each new disclosure about the movements of rock or other mysteries about nature would have to be far-removed from metaphysics to be taken seriously. If this natural phenomenon had been discovered in the 16<sup>th</sup> century, when the level of rational consciousness was completely different from today's, women in the nearest settlement to the area might have been called witches who were responsible for the rocks' movement, and no one would have felt the need at the time to question such explanation based on metaphysics.

Experts who are consulted in the visual or written media on the effects of natural disasters or any unexpected development related to space or irremediable illnesses do not say that those unexpected developments or disasters are messages from any supreme powers beyond physics. On the contrary, they discuss these subjects without taking supranatural explanations as a reference point, and they would not show any interest if someone tries to imply the involvement of any supranatural power. Thus, as a result of rational thinking, theology is destined to lose its power and prestige in many areas that it had previously claimed.

### *Proliferation of Technology and Secularization*

Compared to many centuries ago, the power of developed or developing societies with respect to nature has increased considerably because of technological possibilities. These developments have led to a decrease in the number of social fields where religion is influential. In this section, I will discuss how technology creates problems for religion. There are two subdivisions to this section:

1. Developments in Medical Science
2. Controlling Nature

*Developments in Medical Science and Secularization*

Here is an excerpt from a speech by John F. Kennedy at Rice University on September 12, 1962:

No man can fully grasp how far and how fast we have come, but condense, if you will, the 50,000 years of man's recorded history in a time span of but a half-century. Stated in these terms, we know very little about the first 40 years, except at the end of them advanced man had learned to use the skins of animals to cover them. Then about ten years ago, under this standard, man emerged from his caves to construct other kinds of shelter. Only five years ago man learned to write and use a cart with wheels. Christianity began less than two years ago. The printing press came this year, and then less than two months ago, during this whole 50-year span of human history, the steam engine provided a new source of power. Newton explored the meaning of gravity. Last month electric lights and telephones and automobiles and airplanes became available. Only last week did we develop penicillin and television and nuclear power, and now if America's new spacecraft succeeds in reaching Venus, we will have literally reached the stars before midnight tonight.<sup>28</sup>

It was not a coincidence that the 35<sup>th</sup> President of the USA mentioned *penicillin* while he was giving a speech on the USA space program. Again, it is not surprising that he commemorates penicillin together with gravity, the invention of writing and the power of steam as factors which significantly changed the direction of human history. What makes penicillin historically so important is that it emerged as a remedy for what were until then considered incurable diseases. Because of penicillin, many incurable diseases became curable ones.

But why is the invention of penicillin so crucial in terms of secularization? To answer this question, it is important to recall what people tend to do when they cannot find any solution to their health problems. Fervent believers go to sacred places (Vatican, Kaaba, Wailing Wall, Lourdes, shrines, temples, *etc.*) for their incurable dis-

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28 Kennedy, J. F. (1962, September 12). Speech in The University of Rice. John F. Kennedy Presidential Library and Museum. Retrieved from <http://www.jfklibrary.org/AssetViewer/MkATdOcdU06X5uNHbmqm1Q.aspx> in May, 2014.

eases while preferring to go to hospitals for curable ones. I think this shows a direct correlation between secularization and developments in the medical field. Having the ability to cure incurable diseases, coupled with an increasing number of medical centres, renders treatment faster and cheaper than ever before. This leads people to use modern ways of treatment rather than seeking alternatives such as supranaturalism, alternative medicines, visiting sacred places or invoking the clergy.

For example, in the past, those who could not give birth would go to holy places such as mosques, mausoleums, shrines, as a last resort. Or, people would perform several spiritual rituals to reverse what was thought to be a spell, often related to infertility. Therefore, it would not be implausible to claim that with the development of IVF methods and other newly improved techniques, there might be a considerable decrease in the number of such religious visits and rituals. For instance, to have a baby, Turks would go to the Zile district of Tokat to visit the Huseyin Gazi Tomb. According to legend, if seven small stones are picked from the field near the Tomb and if those stones are then hidden under the pillow, Allah will help the couple to have a baby. However, nowadays, although people are still paying visits to such shrines when they want to have a baby, they tend to try other possibilities as well that were not available years ago like new medicines, IVF method, improving the quality and number of sperm cells, surrogacy, *etc.*

Diseases like mumps, measles, chicken pox, and polio have nearly been eradicated in the modern developed world. In the past, almost every 10-year old child knew what mumps are since either they had had mumps themselves or had seen them already on other children's faces. However, today's children, although they may know mumps is a child disease, do not see mumps anymore, neither on their own faces nor on other children's. Knowing that Turkish children were still being taken to men of religion to have verses from the Qur'an written on their faces up to the beginning of the 1990s would help

us understand why there is a direct link between secularization and preventing mumps through vaccination.

In addition, as a result of developments in medical science, child mortality rates have been drastically reduced in all regions of the world. Table A5 shows the child mortality rate between 1990-2010 for children under five years old.

**Table A5:** Levels in the under-five mortality rate, 1990-2010 (deaths per 1000 live births)

Regions	1990	1995	2000	2005	2009	2010	Decline (percent)
<b>Developed Regions</b>	15	11	10	8	7	7	53 %
<b>Developing Regions</b>	97	90	80	71	64	63	35 %
<b>North Africa</b>	82	62	47	35	28	27	67 %
<b>Sub-Sahara Countries</b>	174	168	154	138	124	121	30 %
<b>Latin America and Caribbean</b>	54	44	35	27	22	23	57 %
<b>Caucasus and Middle Asia</b>	77	71	62	53	47	45	42 %
<b>East Asia</b>	48	42	33	25	19	18	63 %
<b>South Asia</b>	117	102	87	75	67	66	44 %
<b>Oceania</b>	75	68	63	57	53	52	31 %

**Source:** United Nations Report on Child Mortality, 2011

Having changed the daily practices of societies, developments in medical science inevitably affect the human connection with religion. While it was quite normal to seek help from a man of religion for mumps just 20-25 years ago, children of today simply do not have mumps anymore due to vaccination in modern countries: “An effective national health service and global networks of information about alternative medical remedies have undermined local folkloric medical traditions” (Bruce, 2011b: 559). Thus, men of religion, holy places and religion-like mechanisms have lost their power and prestige due to new developments in health care.

However, these advances in medical science do not necessarily reduce belief in religion or supernatural forces. People who seize the opportunity to have a baby through modern science do not lose their faith or their trust in religion or religion-like places. The decrease in the need for religion, temples or clergy does not necessarily lead to a decrease in the level of trust in them. On the contrary, if there happens to be an increase in the number of incurable diseases in the foreseeable future, or if the population growth rate becomes higher than the growth rate in the number of hospitals due to possible structural changes, then it would not be surprising to find that holy places and the men of religion will be popular once again as the last resort for those who cannot find proper treatment. But until then, religion and everything associated with it seems destined to lose its visibility, at least at the social level.

### *Controlling Nature and Secularization*

The unpredictability of nature may become destructive and devastating in natural calamities. If human capacities are not enough to overcome the catastrophic results that come with such unpredictability, then it would be normal to expect humans to seek out help from religion or supernatural powers. But technological advances have rendered human beings more powerful than ever, even to control nature or to handle such disasters. By the end of the day, this ever-increasing power of humans over nature reduces the need for religion-related solutions.

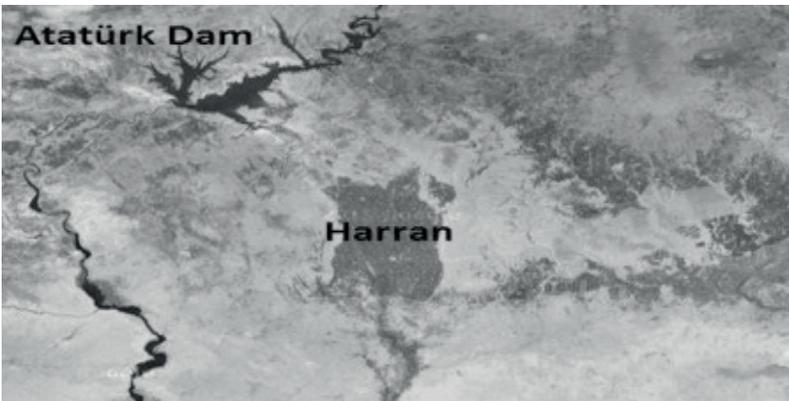
In the past, if nature did not supply the right conditions for agriculture, this might cause heavy losses. If it did not rain enough, so that droughts threatened communities, this was considered a message from the gods or God. The opposite cases were conceived as a blessing from God or for example a rain god. In those times, to reduce such losses or to relieve their pain, people needed spiritual support. At this point, the increase in technological possibilities would reduce how often religion is asked to intervene in everyday life.

For example, people from 24 different villages of Malkara, which is a borough in one of the most modern cities of Turkey, Tekirdağ, collectively prayed for rain in May, 2013 (Malkara Latest News, 2013, May 26). The crowd, which gathered to pray due to the severe drought, included the district governor, mayor, county council members, city council members, political party representatives, the county Mufti, the president of the chamber of agriculture, the presidents of non-governmental organizations, village leaders, and the local people. "We opened our hands to God. We are waiting for the rain. Unknown diseases have just emerged recently and damaged severely our wheat fields. We pray to God for rain and to bestow fertility on our fields," one village headman told *The Malkara Latest News*. Those living in the villages of Malkara district wanted to seek refuge in Allah in such times of drought. During hard times, they sought help from Allah, reciting verses from the Qur'ān, sacrificing sheep to Allah, and performing public religious rituals. Since they have not overcome the problem of drought using worldly means, people in the 24 villages of Tekirdağ took refuge in religion to combat nature's cruelty. Taking refuge in Allah or praying for his help is not a mere coincidence in this case. For Malkara residents, Allah is considered the creator of natural phenomena. Due to the fact that they are deprived of technological tools to overcome such natural disasters, they need Allah to stop what he has caused.

On the other hand, it should be noted that the reason why there are enough water sources for the millions of people in big cities (but not in these villages of just several hundreds of people) is not because Allah/God has more sympathy for the millions in the city than for the villagers. Often with the help of technology, urban people tend to take the necessary precautions to ensure there is enough water. In that way, they do not need to pray to a creator or any supernatural power in times of drought. Because of the use of large dams or artificial ponds, droughts are prevented even in situations where it does not rain for a certain period, or even for years. So, I think it would not be wrong to say that religious rituals, which often

crop up after natural disasters, are generally seen in places where technological advances are still lacking.

This kind of transformation has been experienced by the Harranian people after the world's fifth largest dam - Atatürk Dam - was built between 1983 and 1990. Harran, located in the south-eastern region of Turkey, is one of the country's most conservative districts where even feudal traditions can still be observed. However, unlike the more modern Malkara residents, the more religious Harran people stopped praying to God for rain after they were supplied water by the Atatürk Dam. If we look at satellite images of the Harran district, many water-deprived wastelands just outside of Harran could be seen in a yellow colour. On the other hand, as seen in Picture A3, the Harran district is clad entirely in green after water from Ataturk Dam that was built in 1992 had reached it through channels and pipes. Secularization comes into being at this point. With such technological advances, the Harranian people do not need to plea to Allah for rain anymore, even if it does not rain for years. It indicates that the Harranian people have become secularized, at least in this respect. Despite being very religious, they stopped asking God for rain, and they do not organize any religious rituals even in years without rain.



**Picture A3.** Satellite Images of Atatürk Dam and Harran District (Google Earth)

However, this does not mean that the Harranian people are less religious than the people of Malkara. Proliferation of technological advances does not have to lead to an increase in the number of irreligious people. Rather, it reduces the number of cases in which humans seek help from beyond the physical world. In the end, the new and next generations of Harranians will not even know the verses that had been recited during rainless times. There is no doubt that the Harranian people will continue to beg Allah and seek help - but for other reasons. However, the ever-increasing use of technological facilities such as dams, hospitals, paved roads, faster and safer cars, clean drinking water, *etc.*, has clearly brought about a decrease in the number of cases in which these people would still see the need for Allah.

I think that, a comparison between Bangladesh and the Netherlands in terms of the levels of scientific developments and secularization will supply another crucial insight in this regard. Julian Morris (2006, September 7) rightly asks, “Why is Bangladesh so much more at risk of losing human life and experiencing economic losses from flooding than Holland?” In this, he raises the question of why China and India as well as Bangladesh struggle with floods, although they are way above sea level, while the Netherlands, with half of its land below sea level, does not experience similar kinds of flooding. Although the effects of global warming, such as very high temperatures, heavy rains or disproportionate colds, can bring about the deaths of hundreds or even thousands of people in some countries, these do not necessarily result in the loss of life in some other countries. As an expert on environmental issues, Morris’ response to this reality recalls the very famous letter of an *optimistic* Rousseau (1756, August 18) to Voltaire who had made very *pessimistic* comments regarding the 1755 Lisbon Earthquake:

Without departing from your subject of Lisbon, admit, for example, that nature did not construct twenty thousand houses of six to seven stories there, and that if the inhabitants of this great city had been more equally spread out and more lightly lodged, the damage would have been much less and perhaps of no account (Masters and Kelly, cited in Dynes, 1999: 10).

In parallel to Rousseau, Morris says that it is no coincidence that climate change negatively affects poor people most of the time. To Morris, because of technological developments, people in the Netherlands are not confronted with floods even though heavy rains can be seen throughout the year and half of the country is below sea level. Contrary to the Netherlands, Bangladesh is grappling with floods due to poverty and lack of technological tools. Surely, this situation could be interpreted differently, but when it comes to the secularization level in Bangladesh, it would not be wrong to assume that there is a parallelism between the low level of secularization and the living conditions under which its people are continuously exposed to danger. Dutch people do not rely on God but on their infrastructure during the same heavy rains that can cause flooding in other underdeveloped countries. But it should be stressed that having a better infrastructure does not have to make the Dutch people more atheistic or irreligious than the Bangladeshi people. What should be highlighted at this point is that although the new technology that accompanied scientific developments does not necessarily render human beings more irreligious, people will inevitably need, recall or seek out orthodox religion or folk religions less and less in their daily lives. I think this is one of the main reasons behind the very different secularization levels in Bangladesh and the Netherlands (Norris & Inglehart, 2008: 169, 224, 226, 235, 239).

With the help of technology, humans are now capable of developing early warning systems and building very impregnable defences to minimize the loss of life and reduce the impact of natural disasters. With the advent of new construction technology in Japan, even multi-storey buildings do not collapse during an eight Richter scale magnitude earthquake. During extremely cold weather, the number of deaths in Europe is limited to a few homeless people in the least modernized parts of the continent. The remaining millions of Europeans get over this kind of freezing disasters in their warm houses. In the same way, people in hot countries, where the temperature can get up to more than 50 °C during the day, overcome this potential disaster by means of air conditioning. Today,

life-saving advances in the treatment of stroke, needleless injection, three-dimensional mammography for the early detection of cancer, survival of premature babies, and the gastric bypass method against diabetes are part of normal healthcare in modern societies. Spectacular engineering structures and innovations, as well as an increasing variety of products with falling prices are other opportunities that scientific advances offer. Therefore, it could be said that the rising living standard that comes with scientific developments is clearly reducing the number of cases in which humans would still feel the need for supernatural powers.

## **Conclusion**

The main argument of secularization theory is that the modernization process is for the most part responsible for the loss of social power and visibility of religion at any one time. As part of the modernization process, scientific developments are considered the accelerator of this social transformation. However, contrary to common belief, scientific developments do not contribute to this transformation by falsifying religious teachings or beliefs. Needless to say, beliefs do not require scientific evidence. As it might be seen in the effects of a small village dam that supplies water during times of drought, the contribution of scientific advances to the secularization process seems to have happened not directly but indirectly, namely through science-based technology

To sum up, scientific developments tend to increase the secularization level in two ways: by advancing the level of rational consciousness which allows people to describe or understand natural phenomena in a worldly cause-effect relationship, and by making technology cheaper and pervasive for their daily use. However, it should be emphasized once more that I do not claim that scientific developments increase the number of atheists or irreligious people even though that is also a possibility. Of course, there was some inconsistency between the Medieval Catholic Church's teachings and

some scientific findings. But these inconsistencies do not demonstrate a zero-sum relationship between faith and science. This is because there is no universal rule whereby other belief systems have to conform or support the claims of the Medieval Catholic Church, and the Church was already able to adapt itself to a new era in which scientific findings are taken into consideration more than they had been. However, although it is not possible to claim that there is a zero-sum relationship between faith and science, it can be argued that scientific advances can be held responsible for rendering religion and theology less visible and/or influential in modern-day society in different fields such as explaining sickness and natural disasters.

### **THE ROLE OF CAPITALISM IN THE SECULARIZATION PROCESS**

It is a truth, (almost) universally acknowledged, that industrial capitalism is one of the key dynamics that led to Europe becoming the world's most secular continent. The aim of this section is to build a theoretical framework whereby it can be shown that there is a positive correlation between industrial capitalism and secularization. Hence, in this section, I will briefly touch first on the meaning and structural characteristics of capitalism. Then, I will indicate how capitalism is a key accelerator of secularization at the theoretical level by focusing on four major corollaries of capitalism:

1. Rules of Economy and Secularization
2. Disintegration of Traditional Family Structure and Secularization
3. Increase in Welfare and Secularization
4. Downsizing of the State and Secularization

### **Capitalism**

Capitalism is an economic system in which labour and capital are separated and wherein the means of production are privately owned. In such a system, the state is expected not to decide how, where and how much to be produced; goods and services are voluntarily