Technology, Mythology and the Search for Meaning

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By

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Dedicated
to

Blake, Jocelynn, Connor, Winston,
Nora, Benjamin, Morgan

“No one knows who will live in this iron cage in the future, or whether at the end of this tremendous development entirely new prophets will arise.”
—Max Weber, *The Protestant Ethic and the Spirit of Capitalism*

“Hi! Mike Mulligan! How are you going to get your steam shovel out?”

Mike Mulligan looked around at the four square walls and four square corners and he said, “We’ve dug so fast and we’ve dug so well that we’ve quite forgotten to leave a way out!”
—Virginia Lee Burton, *Mike Mulligan and His Steam Shovel*

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INTRODUCTION

We live in the most technologically advanced world of all times. One could call it "the Technological Civilization." Daily we use a plethora of tools, machines and sophisticated devices. We rely on technical knowledge to navigate our way through this complicated world. Technology has become an absolutely essential part of our way of life, even a necessity for our existence.

This dependence is understandable. Technology appears to be a benign, altruistic friend, generous in its gifts to humankind. We depend on it to solve our problems, physical, intellectual and emotional. We continue to have faith in technology as the means to create a better world. It has become our elixir of life.

However, technology has a shadow side. I will argue in this book that while it appears to be benign, waiting for our direction and under our control, it is actually controlling us. It is forcing us to live in its world in which it is the prime mover. It has come to dictate the values by which we live. As a society we judge things in quantitative rather than qualitative terms. We put a premium on utilitarian over spiritual values. We see the ultimate goal in life in rational, systemic and calculated terms, ignoring emotional, personal, and idiosyncratic concerns. We continually strive to dominate both the organic and inorganic world. This striving requires that we sever thoughts from emotions, human beings from the rest of creation. We have come to see ourselves as the "Subject" and our environment and everything in it as the "Object." Ergo, all objects are subject to our control. We are "the masters of the house." It is a machine-dominated mindset — the engine of self-destruction. This perspective of domination and control has made us dependent on technology. It is a co-dependency. Technology needs us, and we need it to survive.

The sociologist and philosopher Max Weber described this mindset, metaphorically, as "an iron cage." Technology has lured us into the cage as a safe and secure place; however, it has also locked us into a way of thinking and acting that seems impossible to escape. Even more disconcerting is the awareness that we have not only willingly entered the cage but also built it, embraced it, and gilded it. This book reveals how we became encaged. It also offers a potential means of escape — the key to unlock the cage.

Two themes run throughout this study. One is a paradox. Throughout Western history, technology has been a means for humans to gain control over their lives and their destiny — to enhance their freedom. But it has also made them dependent on technology. As well, technology has alienated humans from the divine and from nature, and even from fellow human beings, all seen as an obstacle or a threat to their independence. The other theme is a consistent warning about the shadow side of technology. It has become associated with human qualities that have been seen over time as negative: hubris, pride, sin, guilt, and the unconscious demonic self with a manic disposition and an obsession with power.

This book stands apart in two ways. First, it offers a broad overview, "big picture" approach. It focuses on seven historical eras in Western thought from the ancient Greeks to the present that saw a paradigm shift in beliefs about technology. In each period, the focus is on the key ideas underlying the thinking of the era. These ideas are set forth from early stories and from the writings of the major thinkers, whose ideas both shaped and reflected the thinking of the time.

The other distinguishing feature of the book is the use of myths to identify the dominant technological thought in each era. The term myth is *not* used in the context of "falsehoods," quite the contrary. Myths as I use them are of two types. One is a story which encapsulated the beliefs of the time. This form of myth is particularly related to ancient times, when stories were the way of giving meaning to the creation of the world and the place of human beings in that world. The Genesis creation story, which I discuss in Chapter 2, is a good example. But this form of myth is not just limited to ancient times. Mary Shelley's popular novel *Frankenstein,* which I use as a theme in Chapter 4, has taken on mythic proportions, becoming one of the best-known and influential myths of all times, re-enacted in numerous plays, movies, and science-fiction novels. The other form of myth used in this study is a singular thought or idea that came to shape and define the thinking of an era. In the Scientific Revolution of the seventeenth century, the idea that the whole universe was a Machine that operated by mechanical laws captivated the thinking of the time and shaped a new perspective of technology that has continued to influence our current thinking. In both cases, myths provide a focused and engaging means to capture the prevailing ideas of each era.

I need to note at the outset that I use the term "technology" in a broad context. Each period discussed had different terms to define what we today would call technology. But underlying those differences in terminology is a common belief that technology was influencing and shaping the way of thinking within each era. In essence, it was creating a unique mindset. It is

that mindset that I want to reveal. Sometimes in doing so, I will use the term used at the time, such as “the mechanical arts” for the medieval era, while at other times I will use the modern term “technology” so as to show a continuity that I maintain runs throughout Western thought.

I also need to note that while the focus is on Western civilization and thought, I bring in references to other civilizations and mindsets when they show both a diversity of perspectives on technology and a commonality. These other civilizations with their great thinkers and inventive creations have greatly influenced and contributed to the Western perspective.

1

MYTH OF PROMETHEUS: GIVER OF A STOLEN GIFT

The ancient Greeks had a sophisticated view of technology. Among their abundant myths, the one that offers the greatest insight into technology is the myth of Prometheus. I begin with a synopsis of the myth and then look in depth at what it has to tell us.

Prometheus is a rebellious god who takes delight in defying the other Greek gods. Initially, he helps Zeus to become the supreme god on Mount Olympus. Then he turns around and defies Zeus by stealing fire from him in a hollow reed and giving it to humankind — the one thing that Zeus clearly ordered Prometheus not to do. Prometheus's justification for doing so is to free humans from their dependency on the gods and to enhance their power over their own destiny. Zeus punishes Prometheus by chaining him to a rock until he repents. In the meantime, an eagle feeds on Prometheus's liver, which rejuvenates each night. Having punished Prometheus, Zeus then goes on to punish all of humankind for accepting Prometheus's stolen gift by giving them characteristics that will come to harm them and make life difficult.

This simple yet highly symbolic story captivated the ancient Greeks and has always fascinated later generations. It has been a subject of interest and debate down through the ages as to the significance and meaning of the myth. Noted theorists of technology such as Francis Bacon and Thomas Hobbes in the seventeenth century, and novelists like Mary Shelley in the nineteenth, have reflected on the Prometheus myth and its relationship to their era.

The focus has been on Prometheus's stealing fire from the heavens. The acquisition and use of fire are of significance because it is human beings' first flirtation with technology. It sets them apart from the rest of creation. Of all the species of the earth, human beings learned how to create fire and then use it for their own benefits. They learn that fire can be a powerful friend that gives them enormous capacities once tamed. It enhances their control over their environment: to conserve food, to enjoy

warmth, to fend off animal attacks. However, fire becomes much more than a means of comfort and security. It is the "the technological flame" behind mechanical inventions first evident in the forges of the Age of Iron.[1] It makes human beings into *homo faber*, the makers of tools.

Fire also makes humans into *homo civilis*, civilized beings The fire that Prometheus gives humankind is, symbolically, divine fire, the spark that enhances human ingenuity, imagination and creativity. It becomes the burning desire within each person's psyche to not only control his or her destiny but also to enrich it. Fire symbolizes the great awakening — that burst of light, heat, and energy — that lead the ancient Greeks to embrace technologies of the mind — numbers and the written word, and the fine arts. Prometheus's gift fires the imagination of the ancient Greeks and has taken on a plethora of meanings and symbols thereafter: "the creative spark, the catalyst of the new, cultural and technological breakthrough, brilliance and innovation, the enhancement of human autonomy, sudden inspiration from above, the liberating gift from the heavens, the solar fire and light, lightning and electricity both literal and metaphoric, speed and instantaneousness, incandescence, sudden enlightenment, intellectual and spiritual awakening."[2]

Yet, Prometheus's gift of fire was for the ancient Greeks as problematic as it is celebratory. Humans did not invent or create fire. It comes as a gift from a god, but not a gift openly given. Fire is stolen from Zeus in a cunning way and *then* gifted to humankind. In other words, human beings are the receivers of stolen goods — and continue to benefit from the bounty.

Not enough has been made of the fact that fire was a stolen gift. It is like a mystery. There is something sinister about it, unacceptable. There is only one thing that we know for certain: Prometheus was the thief. But why did he feel the need to steal fire? Were his reasons for doing so rational or mischievous? Why was it a fellow god rather than humans, the recipients, who stole fire? And why were humans punished when they were not involved in the act? Finally, did humans ultimately benefit from the stolen gift or did they lose more than they gained? All these questions have a significant bearing on the Greek perspective of technology because fire was the means by which they acquired the skills necessary for technological advancement. There are answers to these questions, but they are open-ended. This is why the myth continues to fascinate and to be discussed and debated.

Let's look at the evidence to the mystery. There are two foundational versions of the Prometheus myth. The poet Hesiod (ca. 700 BCE) offered the initial interpretation in *Works and Days*. Two centuries later, the

playwright Aeschylus (ca. 525–456 BCE) provided another more famous version in *Prometheus Bound*.

In *Works and Days*, Hesiod tells the tale of Prometheus from Zeus's perspective.[3] He recounts the evolution — or more accurately the devolution — of Greek civilization through five ages or "races" in relation to technology. He begins with the Golden Age, before technology came into existence, and ends with the Iron Age, in his opinion, the lowest of ages and the basest of the metals. Hesiod praises Kronos, Zeus's father, as the creator of order in the world out of chaos. His period of reign in Olympia is the finest: a "golden race of mortal men dwelt on Earth." The golden race is made up of shepherds who live a simple nomadic life. "Like gods they lived, with spirits free from care; / And grim old age never encroached."[4] They depend on their innate skills, not tools, for their livelihood and well-being. Because of the absence of tools, they are morally upright beings who are free of pain and anguish. Even death is simply life passing away pleasantly "as if overtaken by sleep."[5] Eventually, the earth covers this race, although their spirits live on in anticipation of their need to guide and uphold future races. A new race arises in the Silver Age: "an 'inferior' one, on par / In neither brains nor brawn. . . . They had no self control, could not restrain/Themselves from wreaking outrages and pain / On one another, and counted among their vices / Neglect of the gods."[6] Its members fight among themselves and refuse to honour the gods. Zeus buries them. A third race emerges in the Bronze Age; the mortals are "terrible, fierce / And tough as ash-wood for the hafts of spears: War was their work — they loved the work of war — / The doleful deeds, the violence, the gore."[7] Black death overtakes them. Then an intermediate "god-like race of heroes" appears: "Happy heroes, for whom sweet fruits appear / And the fields yield their bounty thrice a year."[8] While there is fighting and violence in this age, at least balance and order between them and nature prevail, an important quality in Hesiod's view of the world.

Then comes the Age of Iron, the most cursed of all the ages. Hesiod laments: "Would I were not among the Fifth. I'm torn: / Would I be better dead or not yet born? / For this age is an Iron Age indeed / Suffering never ceases for our breed."[9] Hesiod describes the Iron Age, with its iron beings as one of degradation of family values, the violation of public laws, increased immorality, and the replacement of satisfaction and acceptance with feelings of envy and jealousy, all the result of technology. Hesiod blames Prometheus for the inauguration of the Iron Age. He claims Prometheus upset the divine order, and placed human interests above that of the gods by giving fire to them.

Hesiod recounts two occasions when Prometheus tricked Zeus, causing the latter to retaliate. The first is when Prometheus gives Zeus the bones of a sacrificial ox while keeping the meat for human consumption. Zeus retaliates by depriving humans of the use of fire. Prometheus then proceeds to steal fire in a live ember and brings it to earth in a funnel. This time Zeus chains Prometheus to a rock. Hesiod delights in telling how an eagle feeds on Prometheus's liver, while each night his liver regenerates for next day's feast. In Hesiod's view, Prometheus deserved his punishment: he defied the gods and the order of the cosmos.

Hesiod depicts Prometheus as a trickster, describing him variously as "sly," "crooked," "scheming," "cunning," and "intent on deceit." He implies that Prometheus has become arrogant, that he has allowed hubris to take control of himself. There is fear that humans will also become disrespectful, rebellious and domineering. So, Zeus punishes humankind as well. Hesiod notes:

> Iapetus' son, exceeding all in guile,
> You're glad you pilfered fire, and tricked my mind:
> So much the worse for you and all mankind
> To come: I'll pay them back evil for fire,
> Evil in which they find their hearts desire;
> They'll greet their bane with open arms![10]

That "evil" is the beautiful woman Pandora. Pandora's story is intimately related to technology and the curse it brought to humankind. Zeus charges Hephaestus, the god of the forge and iron craft (and, interesting enough, the only Greek god to have a trade), with the creation of Pandora. It is important to keep in mind that she is made, not born. In modern times, Pandora has taken on identities associated with technology. She has been described as "a cyborg, a fully 'living machine' imbued with beauty, knowledge, grace and charm — she was 'a wonder to behold'. Yet deep within her core programming she was a liar, full of deceit, and designed to bring death and destruction to mankind, . . . the ghost in the machine."[11] Others have described her as "a superlative, superhuman, synthetic artifact . . . neither born nor summoned into being but *manufactured*, a product of *tekhnē* ('art' or 'skill') rather than *phusis* ('nature') or *theophania* ('divine appearance')."[12]

Pandora in Greek means "she who possesses all the gifts."[13] Yet despite being the woman with everything, Pandora perpetually lusts for more — more food, more money, more material goods, and more sex — and men will stop at nothing to give her all she desires. Though she seems sublime, in reality Pandora is to be dreaded: "Unleashing sorry troubles on

Mankind. . . . / The sea is full of bane, the earth of blight, / Some ailments come by day, and some by night, / Bringing men ills, they roam of their own choice."[14] Once opened, Pandora's famous "box" unleashed the mental tools that symbolically make technology a necessity: greed, consumption, ambition, dominance, and power, stretching the imagination as to unlimited opportunities that technology can provide. Once out of the box, the mental tools can no long be put back in; thereafter, they fed the human drive to dominance over nature. Legend has it that all that remains in the box is hope.

The explanation as to why hope stays in the box has been a subject of great debate ever since. Hope is paradoxical in Greek thought. It can be seen as a blessing and a curse. In Hesiod's version, the fact that it stays in Pandora's box means that humans are deprived of it. He claims that Zeus willed that humans be denied hope so that they will suffer; it was punishment along with all the evils that were set free; its absence prolongs human torment. Aeschylus offers an alternative perspective. He credits Prometheus for giving humans hope. He sees it as the means by which humans can survive amidst the anxiety in their lives brought about by Pandora and Zeus. Humans could strive for something better, not knowing whether it was possible or not; it's a means to endure. The renowned Greek mythographer Edith Hamilton agrees with Aeschylus's perspective: "In terror, Pandora clapped the lid down, but too late. One good thing, however, was there — Hope. It was the only good the casket had held among the many evils, and it remains to this day mankind's sole comfort in misfortune."[15]

In relation to technology, hope is part of the mindset necessary for progress, while fire becomes the means to achieve it. But on the negative side, hope has caused humans to put too much faith in technology, while being blind to its negative effects. Adrienne Mayor ties the story of Pandora to today. "Who can resist opening Pandora's box of tantalizing 'gifts,' marvelous science and technology that promise to improve human life? . . . We rush headlong into a future of humanoid robots, brain-computer interfaces, magnified powers, unnaturally enhanced life, animated thinking things, virtual reality, and Artificial Intelligence."[16]

The playwright Aeschylus presents a more comprehensive account of the story of Prometheus than Hesiod (although interestingly enough does not include the story of Pandora) in *Prometheus Bound*; what we know about the myth of Prometheus comes largely from his account. I have used Eric Havelock's translation of the play because he looks at it in terms of what it tells us about the ancient Greek perspective on technology. (Keep in mind, however, that Havelock's translation is only one among many.)

Havelock's reason for this approach might have come from discussions he had with two of his colleagues at the University of Toronto. Harold Innis and Marshall McLuhan, two noted Canadian theorists of technology, were thinking through their own ideas about technology at that time.[17] In his foreword to the 1968 translation of the play, Havelock notes how he sees *Prometheus* from the technological perspective as relevant to his own time: "The bitter dialectic of the *Prometheus* seems to pursue us still. As the intellectual powers of man realize themselves in technology, with all its possibilities for human leisure and freedom, there seems to be raised up against them the force of a reckless dominating will, a compulsion of political and military power."[18]

Aeschylus tells the tale from Prometheus's perspective. He identifies Prometheus as the Fire-Giver not as the Fire-Stealer; moreover, he describes him as an inventor, teacher, thinker — in essence, as a creative being — rather than as a trickster. In the opening stanza, the fire that Prometheus steals is identified as "the technological flame" that he wants to give as a gift to humankind. Aeschylus notes:

> Your triumph of fire, the technological flame
> It was that he [Prometheus] filched away and
> transferred to man.[19]

Prometheus proudly responds:

> I am the huntsman of the mystery,
> The great resource that taught technology,
> The secret fount of fire put in the reed
> And given to man to minister his need.[20]

Here, neatly summarized, is an image of fire through Greek eyes: a "mystery," a "resource," a "technology," and a "secret," "to minister to his [man's] need."

Aeschylus's identification of Prometheus as the great hunter and the giver of the gift of fire to humans appears to celebrate Prometheus's acquisition of fire as a human triumph. For Aeschylus, fire does not herald their downfall (as it did for Hesiod); it is associated with human ingenuity and creativity, and the progress of the Iron Age. Aeschylus seems to want to elevate Prometheus to the status of a hero, as the great benefactor of the human species.

If so, then he is a tragic hero. *Prometheus Bound* is one of the great Greek tragedies. The play focuses, as the title indicates, on the binding of Prometheus. He is chained to a rock at the beginning of the play and

remains bound through to the end. Furthermore, rather than celebrate Prometheus's gift, Aeschylus has Prometheus say, "Let me rather / Relate to you the tragedy of man."[21] Aeschylus also emphasizes that the human race does not appreciate the gift that Prometheus has given them. Ironically, the very people Prometheus is trying to help abandon him, leaving him to suffer alone on a rock in the Caucasus Mountains. *Prometheus Bound* is a reminder that the gifts of fire and the technological inventions born of fire are, essentially, a double-edged sword, both beneficial and detrimental.

The play opens with Prometheus being chained to a rock by Zeus's henchmen, identified as the Controller and the Executive in Havelock's translation. They representing Might and Force, respectively. They order Hephaestus, the blacksmith of the gods, to forge the chains: "Quick, then, the manacles, and chain him up."[22] From the outset of the play, we are presented with two opposing views of technology. The play itself can be seen as an intellectual debate about technology's virtues and vices. The struggle between Prometheus and Zeus and their respective supporters is not one of action; it is a struggle of the intellect. Apart from the initial scene, in which he is being bound to the rock, Prometheus does not move. He can only argue and reason his views with his words. Zeus is physically absent from the stage. His role is also one of argument rather than action — albeit cases presented by his delegates. Each side presents its point of view in an attempt to persuade the audience.

Initially it is the supporting characters that set out the two perspectives on Prometheus's stealing of fire. This allows the audience to focus on the arguments and to see the wider implications of Prometheus's action. For this is not simply a disagreement between protagonist and antagonist. It is also a cosmic struggle, with Prometheus representing humankind, and Zeus representing the gods and divine order. Hephaestus is reluctant to chain Prometheus to the rock because he admires Prometheus's independent ways and his willingness to challenge divine authority. He also sees Prometheus's actions as unselfish: he risked his own life for the good of humanity. Hephaestus laments: "I — how do I lack the heart to bind/To this wintry crag my kinsman deity! . . . Prometheus, in your pain I groan myself. . . . This your reward who took the road that leads / To the love of man."[23] The Controller, on the other hand, reminds Prometheus that he is the cause of his own punishment; he defied Zeus: "Behold here's one who gets what he deserves."[24] The Controller also points out that Prometheus has brought misery and hardship to humankind.

After Hephaestus and the Controller have had their say, the gods of the earth (of the air, the seas, the rivers, and their subterranean sources)

contribute to the dialogue. While they acknowledge and understand Prometheus's desire to improve the wellbeing of the human species, they question his actions. Genesis, creator of the earthly elements, declares: "What you've paid, Prometheus, is the wage / Earned by a rash, an overweening tongue. And you are not yet humbled, nor will bow / Before defeat, but rather make it worse."[25] Even Prometheus knows why he is being punished: "I knew what I was doing, yes, I knew, / The time I sinned: I do acknowledge it."[26]

Nevertheless, Prometheus puts forward a convincing case in his defence. He reminds humans that without his action, they would not exist. In Zeus's eyes, "man meant nothing. His [Zeus's] intent / Was to obliterate and plant fresh stock."[27] It was only because Zeus wanted Prometheus to create the new race that humans survived. Prometheus is depicted as a caring father having pity on his children who are being punished by Zeus because Prometheus sided with humans over his fellow gods. The audience is thus reminded that Prometheus is not only the giver of fire but also the creator of the human species.

Prometheus proceeds to record the gifts he has bestowed on humans. He divides the list into two. The first refers to material and practical contributions: shelter, agriculture, medicine, husbandry, shipbuilding, items associated with technical knowledge and skills that are essential for immediate human survival. The other list includes mental skills: consciousness and intelligence; ability to use numbers and writing; divination; and knowledge about the stars and the metals of the earth, abilities useful for the advancement of civilization. On the latter, he ranks them as "copper, iron ore, silver and yellow gold." These refer to the four ages of Greek civilization as set out by Hesiod. But Aeschylus has consciously reversed the order, giving preference to bronze and iron over silver and gold. This reinforces Aeschylus's belief that thanks to technology from the bronze and iron ages, Greek civilization has progressed. Aeschylus sums up the discussion of gifts: "Prometheus gave, what man received, technique."[28] Was the playwright suggesting that technical or practical knowledge came before rational thought? Was he suggesting that *homo faber*, man as toolmaker, preceded and trumped *homo sapiens*, man as thinker?

In Aeschylus's account, Prometheus is portrayed as wise, bold and independently minded. Yet he is still physically bound to a rock. And Aeschylus is by no means uncritical of Prometheus's character. He describes Prometheus as arrogant and boastful. "But what you've paid, Prometheus, is the wage / Earned by a rash, an overweening tongue. / And you are not yet humbled, nor will bow / Before defeat, but rather make it worse."[29] It is his arrogance and his lack of humility that cause his

downfall. His greatest "sin" was to succumb to hubris.[30] The ancient Greeks saw hubris as a fundamental character weakness, and a sign of imminent disaster. It was associated with the attempt to exceed one's limits or to refuse to accept one's station in life.[31]

Today, we often associate the Greek word "hubris" with the contemporary meaning of the English word "pride." But there are significant differences between the two terms. Pride, used in a negative sense, is a personal feeling that can lead to one's downfall, or the motivator behind a personal action that can harm or tarnish the reputation of the individual. Recall the aphorism "Pride cometh before a fall," which alludes to the downfall from God's grace in the Garden of Eden. Hubris, on the other hand, is action that will impact on others, and on society as a whole, and even the cosmos. In ancient Greek thought, the individual was not an independent entity acting alone. Every individual was part of an orderly universe where everyone and everything — including the gods — had a particular place or station, which bound them, defined their actions, and kept them in check. To step outside the boundaries of one's circumscribed role would have ramifications and implications beyond the individual and could, ultimately, threaten the order of the cosmos.

Aeschylus appears to be suggesting that Prometheus's act of giving fire to human beings threatens the order of the universe (a concern that Hesiod also had). It opens up the possibility of destruction now that humans have the power of fire and the technological might that it enables. At the beginning of Episode Fourteen, the Deputy describes Prometheus as "the scientific sinner, are you not? / The thief who stole and gave ephemeral man / The privilege of fire, an insult to heaven?"[32] The Deputy also demeans the knowledge that fire and its technological offshoots enhance: "how frail, for all your vehemence / That science seems on which you do rely."[33]

Despite the Deputy's chastisement, Prometheus remains defiant.

> [L]et incandescent flame
> Hurtle to earth: let wings of flying snow
> Blot out the sky: let the deep thunder churn
> Primaeval chaos. I shall still remain
> Unmoved amid it all, refusing to show
> Whose fated hand shall execute his tyranny's overthrow.[34]

The play ends with Zeus marshalling the forces of nature against Prometheus. Still Prometheus stands firm. He believes his punishment is unjust. "Hear now from chaos the cry begun: / 'Behold Prometheus! on him alone / What acts of unrighteousness are done!'"[35] Edith Hamilton admires

Prometheus for his rebellious nature: "His name has stood through all the centuries, from Greek days to our own, as that of the great rebel against injustice and the authority of power."[36]

There is one question in the Prometheus myth relating to technology that has not been raised yet. Who is responsible for technology, and what form should that responsibility take? We know that Prometheus stole the fire that made technology possible. But should he alone take responsibility for his action? If we look at the two major creators of the Prometheus myth, their interpretation is quite different. Hesiod clearly blames Prometheus for giving fire to humans, which in turn allowed them to create tools and advanced technology. This brings about the Iron Age, the worst of all ages according to Hesiod. He is convinced that Prometheus does so for personal reasons: to annoy Zeus, and to satisfy his own ego. Prometheus failed to consider the disruption of the order of the gods and the chaos that ensued. In short, Prometheus alone is responsible.

Aeschylus offers a more nuanced perspective. He admits to Prometheus's arrogance, hubris, and rebelliousness. But he sees him as a paternal guardian of the human race he created, taking pity on their difficult situation as a result of Zeus's determination to first annihilate them and when that didn't happen, punish them. Prometheus gives his offspring fire and technical skills to enable them to survive. He acted with good intentions. Aeschylus sees Prometheus as acting responsibly.

What about the outcome of Prometheus's action? Was it beneficial or not? Here the answer is ambiguous. Aeschylus has Prometheus note all the gifts that he gave to humans to allow them to be less dependent on the gods, to be master of their destiny, and to advance civilization. Certainly, Prometheus believes that his action benefitted humanity. However, what he fails to do is to take responsibility for any negative and damaging effects of technology: the hardships, agony and repression that humans have had to endure thereafter. While he knows of those hardships (the etymology of his name is "Forethinker"), he never acknowledges them or apologizes to the human race. A parallel can be drawn between the repercussions of Prometheus's action on himself and that of humans. "When not in the euphoric mode of Promethean inflation, one experiences the alternate feeling, the counter sensation of being chained permanently to a rock with no vision of any foreseeable future, hopes dashed cruelly."[37] Here, it can be argued, Prometheus acted irresponsibly.

There are three gifts that Prometheus gives to humans which are only mentioned in *Prometheus Bound* without noting their significance: divination, intelligence, and writing. They are important for an understanding of the Greek perspective on technology. Divination, the ability to tell the future,

was a natural gift for Prometheus to give human beings since it was one of his skills. The ancient Greeks associated the ability of foresight with the creative arts, particularly those of the artist and, to a lesser extent, the technocrats and the artisans. These individuals could foresee the end product of their creations, and, in the case of the work of the artisan, their use. The ancient Greeks also saw the fine arts — *poesis* — and the technical arts — *technē* — as related. Both required skilled procedure, whether in intellect or handicraft, brain or hand. The Greeks used the term *techne* (related to the English "technology") in association with words like *sophia* (wisdom), *epiteme* (rigour), and *dynamis* (power), celebrating ingeniousness, and the creativity of the mind. Aeschylus saw technical knowledge as equal in importance to abstract and philosophical thought. Daniel Bell, a sociologist of post-industrialism, notes the significance of technical knowledge to the Greeks: "The introduction of *techne* gives man a second nature, or different character, by extending his powers through adaptive skills and redirective thought; it allows him to prefigure or imagine change and then seek to change the reality in accordance with the thought. The fruits of *techne* create a second world, a technical order which is superimposed on the natural order."[38]

Prometheus also gives humans intelligence, the ability to think. ("I made him [man] conscious and intelligent.") It is Plato (ca. 4247 BCE) who explains why. In so doing, he also offers an explanation for why Zeus punishes humans along with Prometheus. Plato claims that to understand the significance of Prometheus' action, one needs to go back to a time before humans existed. Zeus decides to create a "genera of mortals" to inhabit the earth. Zeus can't be bothered to undertake the task; he instructs Prometheus and his brother Epimetheus to "organize and distribute powers to each [of the mortal genera] as appropriate."[39] Epimetheus begs his brother to let him do it alone. In a moment of weakness (and lack of foresight), Prometheus agrees. Epimetheus begins with animals. He gives each species natural qualities that enable them to survive. For example, for big animals he gives strength without swiftness, whereas weaker animals get swiftness without strength. The result is a world where all animals have a chance to live in harmony with the natural order, survive and multiply, thus creating what we today might call a biosphere or ecosystem, and what the ancient Greeks called the cosmos.

Unfortunately, Epimetheus "didn't notice that he had used up all the powers on the animal genera'" and left none for human beings. Prometheus corrects the error by "stealing from Hephaestus and Athena technical wisdom along with fire." He recognizes that without fire, technical wisdom has no practical application. By giving both, "humankind had

wisdom about the means of living."[40] Humans are able to use their technical knowledge to make the tools and build the structures that will enable them to survive. Zeus realizes what Prometheus has done and why. In *Mythos: The Greek Myths* Retold (2017), Stephen Fry provides a dramatic picture of Zeus's awakening.

> A voice within him seemed to whisper that one day, no matter what vengeance he took, mankind would reach ever upwards until they came level with the gods — or, perhaps more terribly, until they no longer *needed* the gods and felt free to abandon them. No more worship, no more prayers sent up to heavenly Olympus. The prospect was too blasphemous and absurd for Zeus to entertain, but the fact that such a scandalous idea could even enter his mind served only to fuel his rage.[41]

Plato had a hierarchical view of knowledge. At the top is philosophy. It is the means to discover the essences underlying reality, and thus the means to know the nature and purpose of being. These essences have been identified at different times as Ideas, Forms, Universals, or Archetypes. They exist as absolutes in a timeless realm above and beyond that of the material world. They are the ideal or perfect manifestation of earthly entities, essences, and/or moral values. They consist of cosmic opposites, such as light and dark, male and female. They also represent the multiplicity of forms of human beings and other living creatures, and the concept or idea of such moral virtues as Goodness, Beauty and Justice. For the ancient Greeks, these archetypal types or pure principles take on mythic personifications. For the most ancient Greeks, they became associated and identified with particular gods. By the 4th century BCE, however, they increasingly become identified as ideal forms of human qualities and human values. To strive to embrace this realm was the ultimate quest.

Plato sees *technē,* technical knowledge, as inferior to philosophical knowledge. The Greek word *technē* refers to knowledge or skills of a trade from which one earns a wage. Plato looks down on those whose aim in life is to acquire wealth or earn a wage; they are not free to pursue the higher goal of thinking about the good life or devoting oneself to the goodness of the city-state or polis. In the *Protagoras*, Plato argues that artisans should not have the right to participate in government. He reasons that pursuing a trade requires the artisan to focus on personal success and acquiring wealth, thus negating his ability to be concerned with the greater wellbeing of society as a whole. In the *Republic*, the blueprint for his ideal political state, Plato assigns a virtue to only two of the three major classes in Greek society. To the ruling class, he gives wisdom, and to the warrior class, he

gives courage. One may have thought that he would give to the artisan (workers) and farmers, the virtue of work. Instead, he assigns no virtue. In his mind, artisans are too inferior to "be assigned a virtue."[42] In Plato's *Timaeus*, the craftsman is identified as the "*demiourgas*," the one whose task is to give shape and coherence to the material world, but a world that is defective because it has no semblance to the ideal world.[43]

Plato's student and great successor Aristotle (384–322 BCE) does not reflect on the Prometheus myth in his writings. He does, however, offer insights into what came to be called the mechanical arts. Like Plato, he believes in the existence of a higher realm of Ideas or Forms. But he maintains that the means to know such a realm comes through knowledge of the empirical world. This world is made of objects or what he calls "substances" that can be categorized according to their significance. For example, a tall white horse is in one sense "tall," in another sense "white'" and in another sense a "horse." Only the horse is a substantial category; the others are descriptive.[44] Substances are the essence of "being" in the world. They are separate entities but share common characteristics with other substances. But for Aristotle, what makes them common is not the result of a transcendent Idea, as Plato argues, but rather "a universal recognizable by the intellect." Thus, knowledge comes through the senses by considering objects or substances as individual or particular entities.

Such substances are both a unit of matter of this world and an intelligible structure or form. A horse is both an individual and a material manifest entity, while at the same time, part of a larger category or form to which it belongs — the category of "horses." This form gives to a substance not only its essential identity or structure but also its developmental dynamics. For all substances evolve out of a previous substance — an adult from a child, a child from an embryo, or an oak tree from a seed. This evolutionary process is one "from imperfection to perfection; from a state of potentiality to a state of actuality." In this way, Aristotle explains the fact that the world is in a state of flux or constant change. This is not a limitation or "flaw," as Plato believed, but a necessary evolutionary process. Such thinking focuses attention on this world rather than on the realm beyond where Plato's Ideas or Forms exist; it also recognizes the importance of sensory and empirical knowledge as the means to divine knowledge and therefore the ability to know the order and unity of the cosmos. It is also the means by which humans can connect with this higher realm through their own elevated thoughts.

Given Aristotle's focus on knowledge of this world and emphasis on empirical and practical knowledge, it is not surprising that he is more accepting of the mechanical arts and the artisan class than Plato, although

still critical. Just as he categorizes substances and attributes, he also ranks levels of knowledge. He divides knowledge into three fundamental types according to the process used: thinking, doing, and making. These are not rigid categories. One can think by doing; one can also do and make at the same time. Nevertheless, he maintains that one quality transcends the others in each circumstance. And these types of knowledge have a hierarchical importance: thinking is above doing and that is above making. He sees artisans, especially craftsmen, as utilizing physical more than mental skills. He calls the artisan *banausic*, a manual labourer or slave, a pejorative term for a practitioner of the arts who lacks a virtue. In *Politics*, Aristotle sets out his reason for condemning the banausic arts:

> A task and also an art or a science must be deemed vulgar if it renders the body or soul or mind of free men useless for the employments and actions of virtue. Hence we entitle vulgar all such arts as deteriorate the condition of the body, and also the industries that earn wages; for they make the mind preoccupied and degraded.[45]

In Aristotle's mind, the banausic arts fail to improve the quality of the soul, the mind, and even the body. Furthermore, they foster the baser qualities of hubris, luxury, and excessive pleasure rather than the nobler qualities of moderation, restraint, and self-knowledge.

Thus, for Plato and Aristotle, technical knowledge or the mechanical arts are a low form of knowledge, unworthy of pursuit by the educated elite. It would follow then that both philosophers see technology as contributing as much to human misery as to their well-being, a perspective we note in the Prometheus myth.

While the study of philosophy was principally the domain of men, there were notable Greek women who made significant contributions to this realm of thought. Two were Arete of Cyrene (5th to 4th BCE) and Hypatia of Alexandria (ca. 350–415 AD. Both made Greek philosophy available to minority groups, especially women, shunned by the elite. The former is known to be the first female philosopher. Her father, who was one of Socrates' students, taught her. After he died, she took over his School of Cyrene. She taught natural and moral philosophy from a female perspective. The Cyrenaics believed in discipline, knowledge and virtuous actions as means of achieving pleasure. Plato acknowledged such beliefs in *Protagoras*, when he noted "salvation of our life" deepens upon applying a "science of measurement" to moral values.[46]

Hypatia of Alexandria was a philosopher, astronomer and mathematician, schooled in Neoplatonism, a belief system based on the scientific and moral theories of Plato. Present-day scholars believe that she edited

Ptolemy's *Almagest*. Her interest was in astrolabes and hydrometers. She died at the hands of a mob of Christians who saw her as anti-Christian. Her supporters identified her as a "martyr of Neoplatonist philosophy."[47]

Plato's and Aristotle's critical view of technical knowledge and the lack of interest in the mechanical arts may in part explain why the ancient Greeks are not noted for mechanical inventions — what might be called the "hard" inventions coming out of metallurgy. It may also, however, explain why they are recognized for what might be called the "soft" inventions. This is alluded to in Aeschylus's *Prometheus Bound*. Aeschylus has Prometheus note the many riches that he gives to mankind that are offshoots of fire. He notes two in particular as being "the most beautiful of all inventions, the science of numbers and the act of combining letters with which to retain the memory of all numbers, which made it possible to cultivate the arts." Numbering and writing are two of the greatest technological inventions of all time. The Greeks used mathematics, especially geometry, to calculate the movement of the planets and the sun and moon. Mathematics was also instrumental in the scientific and technological discoveries of the Scientific Revolution.

The phonetic alphabet has been equally essential for the advancement of Western civilization. It opened up a new way of communication besides the oral tradition. It allowed for the storage of information in a form (twenty-four Greek alphabetic letters) that made it easy to decode and to reproduce. That enables information to be carried down from generation to generation. A "text" becomes a tangible object that exists independent of the human body, one that can be preserved and passed on. On the other hand, those who have the ability to read now have a new means of gaining power and control over those who do not have such a skill. Writing and reading become "agents of social power."[48] Thus Aeschylus is both shaping and following an accustomed belief in the greatness of Greek civilization when, in *Prometheus Bound*, he acknowledges Prometheus as the source of writing. However, since writing is a by-product of fire, which in turn is a stolen gift, then the ancient Greeks saw writing as having both positive and negative qualities.

While Aeschylus credits Prometheus for introducing numbers and writing to the Greek world, the Greeks were not the original inventors of either of these technologies. The Sumerians in the ancient civilization of Mesopotamia were the first to introduce numbers and writing between 3400 and 3100 BCE. Other ancient civilizations developed their own numbering and writing systems independently, including Egypt (around 3250 BCE), India (2500 BCE), China (2000 BCE) and lowland Mesoamerica (by 650 BCE). The Egyptians had the greatest influence for

our present day. They were the first to use numbers not only to count things but also to measure them. This ability to measure was instrumental in building the pyramids, and establishing advanced mathematics, such as geometry. With regard to writing, the Egyptians introduced an alphabet around 1850 BCE. The Greeks were the first to add vowels and to simplify the phonetic alphabet to only twenty-four characters. The Egyptians also brought their alphabet to Italy around 800 BCE, thus influencing the Roman alphabet that we use today.

In his dialogue *Phaedrus*, Plato discusses the positive and negative attributes of writing vis-à-vis the spoken word. He recounts an exchange between Socrates and Phaedrus. The two go for a walk in the countryside, sit down under a tree beside a stream, and engage in a circuitous conversation. They discuss the nature of speech making, the different forms of love, the nature of beauty, and the complexity of rhetoric. Then Socrates raises the issue of writing: "There remains the question of propriety and impropriety in writing."[49]

Socrates goes on to recall a meeting between the Egyptian god Theuth, who claims to have invented the alphabet, along with numbers, calculation, geometry, and astronomy, and the Egyptian king Thamus. While Theuth notes the advantages and disadvantages of the other inventions, he focuses only on the positive attributes of writing: "Here is an accomplishment, my lord the king, which will improve both the wisdom and the memory of the Egyptians. I have discovered a sure receipt for memory and wisdom."[50] Thamus thinks otherwise. He replies:

> Theuth, my paragon of inventors . . . the discoverer of an art is not the best judge of the good or harm which will accrue to those who practise it. So it is in this case; you, who are the father of writing, have out of fondness for your offspring attributed to it quite the opposite of its real function. Those who acquire it will cease to exercise their memory and become forgetful; they will rely on writing to bring things to their remembrance instead of relying on their own internal resources. . . . As for wisdom, your pupils will have the reputation for it without the reality: they will receive a quantity of information without proper instruction, and in consequence be thought very knowledgeable when they are for the most part quite ignorant. And because they are filled with the conceit of wisdom instead of real wisdom they will be a burden to society.[51]

Socrates adds his own thoughts. He points out that those who rely on written words "might suppose that they understand what they are saying, but if you ask them what they mean by anything they simply return the same answer over and over again. Besides, once a thing is committed to writing it circulates equally among those who understand the subject and

those who have no business with it; a writer cannot distinguish between suitable and unsuitable readers."[52] Socrates also reinforces Thamus's insight that the inventors of new technologies are not the best ones to judge them: "the discoverer of an art is not the best judge of the good or harm which will accrue to those who practice it" — a note of wisdom that has often been overlooked down through the ages including today.

Here, once again, is evidence of the balanced perspective of the ancient Greeks with regard to technology. While Theuth extols the virtues of writing, Thamus notes its limitations. Thamus is not opposed to writing, but rather wants to point out that like all technologies, there is a downside to it. Thamus also perceptively notes how meanings of words change too with new technologies. He points out that memory will now become recall by relying on outer symbols (letters of the alphabet) rather than inner memories, while knowledge will become information; he contrasts the two by referring the former to "real wisdom" and the latter to "conceit of wisdom." The story is a reminder of the ways in which technologies alter not only our way of living but also our way of thinking.

While Socrates, the orator, clearly agrees with Thamus, it is equally evident in *Phaedrus* that Plato, the writer, does not. Plato could appreciate the unfortunate consequences of writing, such as the loss of memory, but he mainly notes the advantages of the written word. The difference between the two scholars arises in a famous passage in Plato's *The Republic*. Plato gets Socrates to attack "poetry" even though it was a part of oral expression that Socrates admired. The debate between the two was symbolic of the tension between the traditional oral culture and the new literate culture. It is an early example of the tension when a new technology is introduced.

The importance of writing and reading is that they are two of the major means by which we communicate. Along with oral communication, they are the foundation of conscious thought. But oral communication is not a technology; we are not taught to speak. Writing and reading, by contrast, require instruction. And they have become the bedrock of our means of communication since they allow for information and knowledge to be carried down from generation to generation free from the constraints of individual memory and oral communication that get lost over time. It also enables anyone who can read to utilize written knowledge. Such open availability has made writing and reading two of the greatest technological inventions of all times, and fundamental to the advancement of civilization. And yet, they have lessened our ability to recall things by memory; they have made our brains less alert.

2

MYTH OF ADAM: RELIGION OF TECHNOLOGY

Our modern Western view of technology owes a great deal not only to classical Greek perspectives but also to those of early Judeo-Christian traditions. Having examined the myth of Prometheus for the ancient Greek view of technology, let us turn to the myth of Adam and the creation accounts in the Book of Genesis in the Hebrew and Christian bibles as the entry point for understanding the Judeo-Christian perspective. It should be noted that a similar creation account of Adam appears in the Qur'an.

The story of creation is *the* most important and recognizable myth in Western thought. It is the basis upon which later literature in the Western world is based. Scholars interested in moral and ethical values underlining Western thought have studied it in depth. Yet in some ways, the story is not well known. Biblical scholars have confirmed that the Book of Genesis was not written by one person or at one time. It is an amalgamation of numerous oral traditions from various sources, and then brought together into one written text during the 6th and 5th centuries BCE, when most Jews were exiled in Babylon.[1] More importantly, there are two creation stories in Genesis with significant differences between them on a number of mythical events, including how the world was created, how Adam was created in relation to the rest of the inanimate and animate world, the existence of the Garden of Eden, and the Fall. It is important to keep in mind that in these two creation stories, Adam is both an individual supposedly created at the time and symbolic of all humankind thereafter. While analyzing these two early creation myths, I will also show how later events noted in Genesis, such as the Flood and the building of the Tower of Babel, greatly influenced Jewish and Christian perspectives on technology.

The oldest of the two creation stories is known as the "J" or "Yahweh" tradition, likely written ca. 540 BCE. Biblical scholars see this account as representing the beliefs of a nomadic herding society that was in tune with the natural world. This pastoral vision shows a distinct bias against an

urban, more technologically advanced society.[2] This version can be found in Genesis 2:4–3:24. The "P" or "Priestly" tradition dates to ca. 400 BCE. It shows a greater emphasis on the orderly creation of the world and recognizes the importance of urban society and technology, even if it was in some respects no less critical of technology. This story is presented in Genesis 1:1–2:3. As the two accounts progress, they blend together into one, especially after the account of the Flood.[3]

At the beginning of both creation accounts there is agreement that God created the world out of nothing (*ex nihilo)*. The P story notes: "when God created the heavens and the earth, the earth was a formless void and darkness covered the face of the deep." (1:1) In the J tradition, "the Lord God made the earth and the heavens, when no plant of the field was yet in the earth and no herb of the field had yet sprung up." (2: 4–5) So in both cases, it took God's creative power to bring order and life to the world. In *The Seven Pillars of Creation* (2010), theologian William P. Brown uses the metaphor of a construction site for the orderly sequence of creation in the Priestly version: "To press a metaphor, creation in Genesis 1 is a construction zone in which various building blocks are joined together to build a cosmic edifice replete with order and variation."[4] What God creates is not divine in its own right. It is separate, but "the work of His hands." Thus, the world can be seen as a divine artifact or handicraft. God could, therefore, be compared to a master builder or a craftsman, prototypes that "became the matrix for the modern symbols of the world: the world as machine, the world as workshop and the world as experiment."[5]

Once one begins to look at the sequence of creation and the nature of the world God created in the two myths, significant differences are evident. In the J tradition, the older version, God creates Adam first, then vegetation and animals, and finally Adam's soulmate, Eve, who is forged out of Adam's rib. In this version, Adam is moulded out of a lump of clay. Here again, an analogy can be made of God as a divine potter. Also, since Adam's body consists only of clay, the story does not distinguish humans from other animals that are formed from the earth. In this story neither Adam nor Eve is created in God's image. It can be argued that in this version what distinguishes man was "his possession of a soul — in modern terms, his consciousness — which in some way mirrored that of the Divine Being."[6]

In the P tradition, God made the world of nature first: "vegetation, plants yielding seed, and fruit trees of every kind," (1: 12), followed by creatures of the sea, the birds in the sky, cattle and wild animals. Only then does God make Adam and Eve. In this version, it is evident that Adam and