AMERICAN UNIVERSITY STUDIES

Forging the Methodology that Enlightened Modern Civilization

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Introduction

The influence of science and technology is so prevalent in western societies today that it is easy to take for granted how much the standards of living, advancements of knowledge, medical developments, educational opportunities, liberating and equitable social and political institutions, along with world travel and nearly instantaneous communication and dissemination of information are owed to these achievements. Yet visiting those societies that have not yet acquired the benefits of western science and culture, as in most countries of Africa and some in the Middle East and South America, and to a lesser degree now in regions of China and India, offers a striking reminder of the difference.

Moreover, those who disparage this progress owing to the greater devastation during the First and Second World Wars due to the advances in technology that produced gas warfare, more lethal artillery, horrendous bombing raids, V-1 and V-2 rockets, and the incredible radiational incineration spewed by the atomic bomb, overlook that it was not the advanced weaponry that was at fault, but fanatics like Hitler who incited the wars. While Einstein's formula $E = mc^2$ and Lise Meitner's theory of nuclear fission, along with the effort of the most brilliant team of theoretical physicists and engineers ever assembled, led to the success of the Manhattan Project and the detonation of two atomic bombs, it was the heads of state who decided how it would be used. The realization that Werner Heisenberg was directing nuclear research in Germany with the intention of creating an atomic

bomb led to Niels Bohr informing Churchill and Leó Szilárd and Einstein advising President Roosevelt that their countries must create the weapon before Hitler, otherwise the Third Reich would win the war and dominate the world.

Furthermore, the decision to drop the bomb on Hiroshima and then on Nagasaki was not made by the scientists that created the bomb, such as Enrico Fermi, James Franck, and J. Robert Oppenheimer who were opposed to using it, but by President Truman. It was his decision that dropping the bombs was necessary to force the Japanese to surrender without having to invade Japan that could have resulted in many more casualties. Later, during the cold war between the Americans and the Russians, long range warfare was made possible by the development of intercontinental nuclear warheads or missiles leading to the Cuban missile crisis that was resolved owing to the threat of "mutual destruction."

Again, however, it was the heads of state and generals who were responsible for making the decisions and providing the financing to create the advanced military technology to serve their national interests. Similar arguments can be offered to refute the charges that technological developments also were responsible for the dreadful initial exploitation of unskilled workers during the industrial revolution, creation of modern urban ghettos, environmental degradation, and climate change, but that would be like blaming the Christian religion for the current pedophiliac scandal of the Roman Catholic Church or Islam for the worldwide Jihads, rather than the clerics and terrorists responsible for these deviant acts.

Instead of blaming the institutions for these depravities, they should be attributed to the pervasive weaknesses of human nature that produced them: irrationality, avarice, egocentrism, aggression, sadism, and the lust for and fixation on power. It no longer being credible to ascribe these tragic human failings to original sin, they now can be attributed to our evolutionary heritage driven by competitive natural selection or "survival of the fittest" as encoded in our genes. As with social conventions, political institutions, legal structures, economic systems, and personal relations, the effective utilization of scientific research and technology can only be as humane or enlightened as their use by human beings.

Another reason there seems to be such an unappreciative attitude toward contemporary science is that unlike the Enlightenment when savants were extolling the accomplishments and promise of modern science in contrast to the stifling feudal system it was replacing, most people today ignore the horrific conditions that prevailed throughout history: the poverty, disease, ignorance, illiteracy, and natural disasters, along with the universal exploitation and repression by the prevalent tyrants or autocrats.

A further cause of the aversion to science is that its resultant worldview has discredited the supernatural framework of the world's religion's that provided so much spiritual comfort, support, and moral direction in the past, as it still does in

the present. Dislodging human beings from the center of the universe and explaining their origin as due to natural conditions rather than a special creation, replacing miracles by scientific explanations and eliminating the credibility of such Christian doctrines as the virginity of Mary and the virgin birth of Jesus (who would have lacked the male chromosomes for a normal birth), and understanding the molecular impossibility of the transubstantiation of the Eucharist has eroded the belief in Christianity for those who comprehend the significance of these developments.

Moreover, having discovered that mystical experiences, feelings of blissfulness, and hearing divine commands are due to localized neurophysiological processes and excluding any transcendent meaning to human existence given the distressing state of the universe and human existence as we know it, science is looked upon as the destroyer of cherished, consoling beliefs, rather than as the liberator from ignorance and superstition and ameliorator of the human condition.

It is the hope of the author that when confronted by the remarkable discoveries, theoretical explanations, cognitive transformations, and technological advances that brought about these developments the reader will be better able to accept scientific inquiry as the intellectual and social liberator that it has been, as well as the most effective means for improving the dreadful living conditions of the past.

But my focus will be on how this understanding has been acquired, rather than on the changes that it has brought about. This is because the former conforms more to my research and publishing endeavors and also because the other aspect has been excellently described by Timothy Ferris in his recent book, *The Science of Liberty*,[1] that I commend to anyone interested in knowing what a difference scientific inquiry has made to the advent of modern civilization.