ONCE UPON A TIME.....

ISAAC NEWTON THE ENGINEER

By: Sdr. K.H. Man, Standing Committee on Publications

Labelling Issac Newton an engineer by profession is of course, an act of foolish hubris. Engineering as a profession did not exist three hundred years ago, and besides, Newton transcends such artificial boundaries. Being the founder of mechanics and optics, he is sort of an honourary engineer. Still, labels are merely labels. His work however reveals a keen eye at engineering as a craft. Issac Newton is a kindred spirit.

The problem solving talent of Issac Newton is legendary. In semi-retirement, he once solved in a single night a mathematical problem that stumped numerous eminent colleagues for years. Newton's ability to assimilate and apply knowledge, and to solve practical problems, is something all engineers should aspire to emulate.

Although scientists like Halley and Hooke already had an inkling that an inverse square rule would satisfy Kepler's results, it was Newton who made the crucial step of formulating the concept of universal gravitation, and it was Newton who fashioned the mathematical tools and produced verifiable results.

This is quite remarkable, for it was a 22 year old undergraduate who broke away from contemporary ideas and practices taught by all-powerful professors, and scrupulously followed a rigorous scientific methodology of his own. An apple story doesn't do justice at all to this accomplishment. A young Newton would have been deathly bored with learning by rote. Newton made full use of his lump of gray matter; we should too. The *Principia* isn't simply a precursor to mechanical engineering, it is also a triumph of the human spirit.

Issac Newton has a thing or two to teach those who are enamoured with virtual surrogates and simulation—he never hesitated to get his hands dirty when the need arose. Apart from a devotion to experimentation as a requisite for scientific work, he also did applied science, like an engineer. The Newtonian telescope for example, the first practical reflecting telescope, was the result of Newton's efforts to avoid chromatic abberation found in early refracting telescopes.

In 1695, when his scientific output was waning, Newton accepted a post at the Royal Mint, as Warden. While most people regarded the appointment as a retirement perk of a scientific giant, Newton wasn't about to relax. The kingdom's coinage was in a state of crisis; the Treasury was clueless as to what has to be done. Someone has to save England.

Prior to Newton's appointment, coins were easily clipped or counterfeited. Coins with milled edges had just been introduced, but the mints simply could not make enough to reverse the loss of trust in English coins. Newton, being the practical scientist and mathematician that he was, immediately set about making numerous management and engineering changes. He observed and timed the process of minting coins, analysed his data and then adjusted the production line to improve efficiency. By all accounts, he was a slave-driver, but to his credit Newton pushed himself just as hard. To bring back the people's trust, Newton set up a network of agents to pursue counterfeiters. Often, this led to a personal involvement in certain cases. So at age 53, Newton dabbled in undercover work as a Treasury agent. Harsh penalities championed by the Warden—a counterfeiter was hung, drawn and quartered for high treason—and a rapidly improving mint turned the tide, and so Newton saved England from economic ruin.

Issac Newton died in 1727 and was buried at Westminster Abbey, at what is now known as the Scientists' Corner. He has other great scientists like Darwin and Maxwell to keep him company.

The life and times of Sir Issac Newton cannot really be distilled into a couple of pages, nor should we see him only as the Grand Old Man with the wig and the apple. But it is fitting that we recognise and appreciate in Newton some of the admirable qualities of an engineer, being one of those who led the way so that today we can proudly call ourselves engineers.

As the Latin inscription on his tomb quite aptly puts it: "Mortals! Rejoice at so great an ornament to the human race." ■

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