A Biographical Sketch of

Isaac Newton

by Leong Chong Ming

"Nature and Nature's laws lay hid in night: God said, let Newton be! and all was light."
—— *Alexander Pope*

Sir Isaac Newton (1642-1727), hailed as one of the greatest mathematicians the world has ever produced, had the following more modest view of his own monumental achievements: "...... to myself I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me." As he examined these shells, he discovered to his amazement more and more of the intricacies and beauties that lay in them, which otherwise would remain locked to the outside world.

Newton was born prematurely on Christmas Day, 1642, in Lincolnshire, England, in the same year in which Galileo died. He was brought up by his grandmother from young and studied in a neighbourhood school. Newton's maternal uncle, who himself was a graduate from Cambridge, saw the tremendous academic potential in the young lad and persuaded his mother to enrol him into Cambridge. So in 1661, at the age of 19, Newton entered Trinity College, Cambridge as a freshman.

Newton's initial interest was in chemistry which did remain in him throughout his life. In his first year at Trinity, he got hold of a copy of Euclid's *Elements* which he studied with much interest. He also studied the works of Kepler, Wallis, Galileo, Fermat, Huygens and other mathematicians. To add to his mathematical exposure and training, Newton attended a series of lectures given by Professor Isaac Barrow, the Lucasian Professor of Mathematics at Cambridge in 1663. All these were to influence and shape his career path in becoming a mathematician, which perhaps he never thought he would become. Newton's involvement in mathematics was thus very much a result of learning from his predecessors. So in a letter to Robert Hooke, Newton said, "If I have seen farther than Descartes, it is because I have stood on the shoulders of giants".

From 1664 to 1666, a large part of Europe came under the severe attack of the bubonic plague which claimed almost one third of Europe's population. As a result, Trinity College was closed and Newton had to return to his home at Lincolnshire to think and contemplate. It was during these 3 years that Newton made some of the greatest discoveries the world ever knew at that time. Newton discovered:-

1) the law of gravitation and the laws of mechanics,
2) the fluxional calculus,
3) the binomial theorem,
4) the nature of colours.

Legend has it that one day Newton was sitting under an apple tree in deep contemplation when suddenly he saw an apple fall onto the ground; in one version of this legend the apple actually fell onto his head! That triggered off his theory of gravitation and subsequently he developed his laws of motion (Editor's note: the "apple-head" tale is probably apocryphal.).

Although Newton was very prolific in scientific research, he was slow in publishing his findings. It was Newton's good friend Edmund Halley (1656-1742) who, being impressed with Newton's findings, persuaded him to publish his results. Halley even funded the entire publication of Newton's classic — "Philosophiae Naturalis Principia Mathematica".

This rare classical treatise was first put into print in 1687. This book basically contains an exposition of physics, mathematics and astronomy in the language of pure geometry.

The creation of the Principia was a gift to the mathematical world but it also generated an unpleasant dispute between England and Germany. In Germany, Gottfried Wilhelm Leibniz (1646-1716) had developed the calculus at about the same time as Newton. The similarity between Leibniz's works and Newton's Principia cast suspicion that Leibniz had plagiarised Newton's works. A Swiss mathematician living in England wrote a letter to the Royal Society carrying with it the implication that Leibniz was guilty of plagiarism. Leibniz, upon hearing this, protested vehemently and appealed to the Royal Society for justice. The argument as to who first invented the calculus was so sour that it caused bitter tension between the two countries. Finally the Royal Society had to step in to settle the dispute. The Society's report, with the title Commercium Epistolicum, was published in 1712. In the report, the Royal Society arrived at the conclusion that Newton was the first inventor of the calculus but Leibniz was the first to publish it. However, the underlying bad feelings did not particularly improve after this.

Towards the end of his life, Newton devoted more time to theology than scientific research. In 1727, at an old age of 85, Newton took his last breath and rested from his labours. He was buried in Westminster Abbey with great honour. Voltaire, who attended Newton's funeral, said afterwards, "I have seen a Professor of Mathematics, only because he was great in his vocation, buried like a king who had done good to his subjects". England had lost a great prince of Mathemaitcs forever, but his legacy lives on. M²

References

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2. C. B. Boyer and U. C. Merzbach, *A History of Mathematics*, John Wiley & Sons, New York, 1989.

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