

*equal and opposite reaction ; or the mutual actions of two bodies are always equal and oppositely directed in the same straight line.*

The laws of motion are the fundamental principles of mechanics, and when these laws are properly expressed in mathematical language there can be derived from them, by purely mathematical reasoning, a vast and orderly store of knowledge. Descartes unfortunately never understood the laws of motion, therefore the first principles from which he started were wrong, and no amount of correct reasoning from false premises could lead him to correct results. Had he condescended to verify his results by experiment, he might have detected his errors, retraced his steps, and amended his first principles. It may be said that Galileo laid the solid foundation on which Newton built, and Descartes invented some of the tools that Newton used in building.

The discovery of the laws of motion was, perhaps, Galileo's greatest contribution to science, and formed a fitting close to his remarkable life. On January 8th, 1642, the veteran Galileo died, and before the close of that year there was born in England a sickly infant who was destined to carry on gloriously the work so nobly begun by Galileo.

Isaac Newton was born, to a widowed mother, in the manor house of Woolsthorpe, near Grantham, in Lincolnshire, on Christmas day, 1642. His father, who was a yeoman farmer, died a few months after his marriage with Harriet Ayscough, and very little is known of him. The care of the delicate infant and of the farm both devolved upon Mrs. Newton, who was eminently sensible and practical, and in every way a most excellent woman. Mrs. Newton was afterwards married to the

Rev. Barnabas Smith, to whom a parishioner had recommended "the widow Newton as a most extraordinarily good woman." On her second marriage, she went to live at North Witham, and her mother, Mrs. Ayscough, came to Woods-thorpe to take charge of Newton. After attending the village school for some time, Newton was sent to the grammar school at Grantham, which he attended for three years, during which time he boarded at the house of Mr. Clark, an apothecary. At first, Newton was neither a diligent nor a successful student ; Latin grammar apparently had no charms for him, and he states himself that he was the last boy in the lowest class but one. The school bully, who held the place immediately above Newton in class, one day gave Newton a severe kick in the stomach ; whereupon, Newton straightway fought and beat the bully. This victory aroused his ambition, and from that time he devoted himself with incessant energy to study and quickly reached the head of the school. During this period, though he did not often join his companions in play, he was a recognized leader among them, and supplied them with a variety of toys of his own construction. He was particularly skilful in making kites, waterwheels and windmills. One of his favorite amusements was to frighten the country people by tying a paper lantern to the tail of a kite on a dark night, which the country people took for a comet foreboding war, pestilence and famine.

The one love affair of Newton's life occurred while he was an inmate of Mr. Clark's household. He appears to have fallen in love with Miss Storey, who also boarded with Mr. Clark's family. She was two years younger than Newton, and is