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978-1-108-02556-0 - *Memoirs of the Life, Writings, and Discoveries of Sir Isaac Newton*, Volume 1

David Brewster

Excerpt

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## M E M O I R S

OF THE

## LIFE AND WRITINGS OF SIR ISAAC NEWTON.

## CHAPTER I.

Great discoveries previous to the birth of Sir Isaac Newton—Pre-eminence of his reputation—The interest attached to the study of his life and writings—His birth and parentage—An only and posthumous child—Notice of his descent—Inherits the small property of Woolsthorpe—His mother marries again—Is sent to a day-school—His education at Grantham School—His idle habits there—His love of mechanical pursuits—His windmill, water-clock, self-moving carriage, and kites—His attachment to Miss Storey—His love of drawing and poetry—His unfitness to be a farmer—His dials, water-wheels, and anemometer—Leaves Grantham School—His commonplace book and college expenses.

THE seventeenth century has always been regarded as the most interesting and eventful period in the history of positive knowledge. The discoveries and speculations of a preceding age had prepared the way for some grand generalization of the phenomena of the material world; and sages of lofty intellect heralded the advent of that Master-mind by which it was to be accomplished. The establishment by Copernicus of the true Solar System, and of its independence of the sidereal universe, led to the investigation of those general laws with which Kepler laid the foundations of Physical Astronomy; while, in combination with these, the observations of Tycho, the telescopic discoveries of Galileo, and the speculations of Hooke and Borelli, contributed in no slight degree to the establishment of the theory of universal gravitation, by which Sir Isaac Newton has im-

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mortalized his name, and perpetuated the intellectual glory of his country.

A generalization of such vast extent, enabling us to determine the position and aspects of the planets during thousands of years that are past, and for thousands of years to come, could not but be regarded as an achievement of the highest order : and the name of Newton, therefore, has, by universal consent, been placed at the head of those great men who have been the benefactors and ornaments of their species. Imposing as are the attributes with which Time has invested the sages of antiquity—its poets and its philosophers ; and dazzling as are the glories of its heroes and its lawgivers, their reputation pales in the presence of his ; and the vanity of no presumptuous school, and the partiality of no rival nation, has ventured to question the ascendancy of his genius. The philosopher, indeed, to whom posterity will probably assign the place next to Newton, has characterized his great work,—*The Principles of Natural Philosophy*, as pre-eminent above every other production of human genius,<sup>1</sup> and has thus divested of extravagance the encomium of contemporary friendship.

Nec fas est propius mortali attingere Divos.

HALLEY.

So near the gods—man cannot nearer go.

But while the history of such discoveries must, to the intellectual world, be a subject of exciting interest, the biography of him who made them,—the details of his life, his studies and his opinions, cannot fail to arrest the attention and influence the judgment of every cultivated mind. Though the path of such a man may have lain in the secluded vale of humble life, unmarked by those dramatic incidents which throw a lustre even round perishable names, yet the inquiring spirit will linger over the history of a mind so richly endowed, will study its intellectual and moral phases, and will seek the shelter of its

<sup>1</sup> The Marquis La Place.—See his *Exposition du Système du Monde*, Livre cinquième, chap. vi. p. 336.

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authority on those solemn questions which Reason has abandoned to Faith and Hope.

If we look for instruction from the opinions of ordinary men, and watch their conduct as an exemplar for our own, how interesting must it be to follow the most exalted genius through the labyrinth of common life,—to mark the steps by which he attained his lofty pre-eminence,—to see how he performs the functions of the social and the domestic compact;—how he wields his powers of invention and discovery;—how he comports himself in the arena of intellectual strife; and in what sentiments, and with what aspirations, he leaves the world which he has adorned.

In each and all of these phases, the writings and the life of Sir Isaac Newton abound with the richest counsel. Here the philosopher will learn the art of patient observation by which alone he can acquire an immortal name; the moralist will trace the lineaments of a character exhibiting all the symmetry of which our imperfect nature is susceptible; and the Christian will contemplate with delight the High Priest of Science quitting the study of the material universe—the scene of his intellectual triumphs, to investigate with humility and reverence the mysteries of his faith.

ISAAC NEWTON was born in the Manor-house of Woolsthorpe, a hamlet in the parish of Colsterworth, in the county of Lincoln, close to the village of Colsterworth, and about six miles south of Grantham, between one and two o'clock in the morning of the 25th December, old style, 1642, in the same year in which Galileo died. His father, Isaac Newton, who was proprietor and farmer of the manor of Woolsthorpe, died in the thirty-seventh year of his age, a little more than a year after the death of his father Robert Newton, and only a few months after his marriage to Hannah Ayscough, daughter of James Ayscough of Market Overton, in Rutlandshire. Mrs. Newton had thus been left in a state of pregnancy, and appears to have

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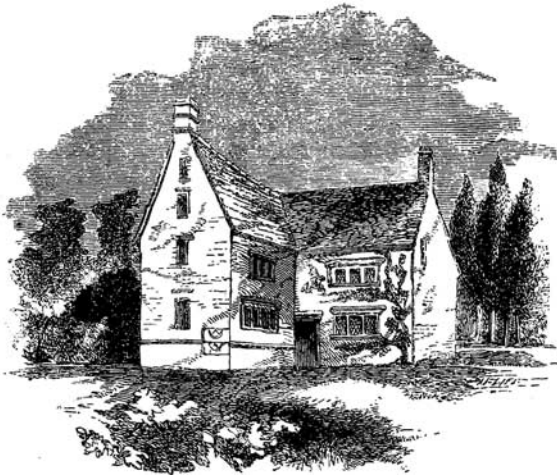
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given a premature birth to her only and posthumous child. The infant thus ushered into the world was of such a diminutive size, that, as his mother afterwards expressed it to Newton himself, he might have been put into a quart-mug, and so feeble apparently was his constitution, that two women who were sent to Lady Pakenham's at North Witham, to obtain for him some tonic medicine, did not expect to find him alive on their return. Providence, however, disappointed their fears, and that frail tenement which seemed scarcely able to imprison its immortal mind, was destined to enjoy a vigorous maturity, and to survive even the average term of human existence.



Manor-house, Woolsthorpe ; the Birthplace of Sir Isaac Newton, showing the Solar Dials which he made when a boy.

The small Manor of Woolsthorpe is said to have been more than a hundred years in the possession of the family, who,

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according to one account, were descended from Sir John Newton: of Westby, in Lincolnshire, and, according to another, from a Scotch family in East Lothian. The Manor-house is situated in a pleasant little hollow on the west side of the valley of the river Witham, which rises near it, and one spring of which is in the Manor. From the house there is an agreeable prospect of the village of Colsterworth to the east, and, according to Dr. Stukely, the air is so good, combining the sharpness of the midland part of the kingdom with the more genial temperature of the low parts of Lincolnshire, that the country round Woolsthorpe was called the Montpellier of England. The Manor-house consists of two storeys, and is built of stone. Sir Isaac's study before he went to college, and when he visited his mother from the University, was in the upper flat. The bookshelves are described by Dr. Stukely as having been made by Sir Isaac himself with pieces of deal-boxes, and as having contained 200 or 300 books belonging to his father-in-law, Dr. Smith, which Sir Isaac presented to Dr. Newton of Grantham.

The Manor of Woolsthorpe, Sir Isaac's paternal estate, purchased by his grandfather in 1623, from Robert Underwood, was worth only £30 per annum, but his mother possessed a small estate at Sewstern, on the borders of Leicestershire, and about three miles south-east of Woolsthorpe, which was worth about £50 per annum; and it is probable that the cultivation of the little farm, on which she resided, added to the limited rental upon which she had to support herself and educate her son.

Under the guardianship of his uncle, James Ayscough, and the tender care of his mother, young Newton remained at Woolsthorpe acquiring gradually that strength of constitution which was essential to the development of his intellectual powers. Before, however, he had reached his fourth year, he was deprived of his mother's care, in consequence of her marriage, on the 27th January 1645, to the Rev. Barnabas Smith,

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rector of North Witham ;<sup>1</sup> and her duties devolved upon her mother, the wife of James Ayscough, and a daughter of Mr. Blythe of Stroxtton, who, for this purpose, took up her residence at Woolsthorpe. At the usual age Isaac was sent to two little day-schools at Skillington and Stoke, two hamlets about a mile to the north of Woolsthorpe, and about the same distance from each other, acquiring the education in reading, writing, and arithmetic, which such seminaries afforded.

When he reached the age of twelve he was sent to the public school at Grantham, then taught by Mr. Stokes, who had the character of being a good teacher, and was boarded at the house of Mr. Clark, an apothecary in the town, whose grandson, Mr. Clark, exercised the same profession there in 1727, the year of Newton's death. The house in which our young philosopher lodged, was next to the George Inn, "northward in the High Street, which was rebuilt about 1711." According to the confessions which Sir Isaac himself made to Mr. Conduit, he was extremely inattentive to his studies, and stood very low in the school. When he was the last in the lowermost form but one, the boy next above him, as they were going to school, gave him a kick on the stomach, which occasioned a great degree of pain. As soon as the scholars were dismissed, New-

<sup>1</sup> The issue of this marriage was a son and two daughters—Benjamin, Mary, and Hannah Smith, from whom were descended the four nephews and nieces who inherited Sir Isaac's personal estate.

The following account, from Conduit's MSS., of Mrs. Newton's marriage to Mr. Smith, was given to Mr. Conduit "by Mrs. Hutton, whose maiden name was Ayscough :—

"Mr. Smith, a neighbouring clergyman, who had a very good estate, had lived a bachelor till he was pretty old, and one of his parishioners advising him to marry, he said he did not know where to meet with a good wife. The man answered, The widow Newton is an extraordinary good woman. But, saith Mr. Smith, how do I know she will have me, and I don't care to ask and be denied; but if you will go and ask her, I will pay you for your day's work. He went accordingly. Her answer was, she would be advised by her brother Ayscough. Upon which Mr. Smith sent the same person to Mr. Ayscough on the same errand, who, upon consulting with his sister, treated with Mr. Smith, who gave her son Isaac a parcel of land, being one of the terms insisted upon by the widow if she married him." This parcel of land was given by Mrs. Smith, and was probably her property of Sewstern.—See the *Annual Register* 1776, Characters, p. 25.

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ton challenged the boy to fight, and for this purpose they went into the churchyard. The schoolmaster's son came up to them during the fight, and, "clapping one on the back and winking to the other," encouraged them both to continue the encounter. Though Sir Isaac was not so robust as his antagonist, yet he had much more spirit and resolution, and therefore succeeded in the combat, beating his opponent till he declared he would fight no more. The schoolmaster's son, who seems to have been an amateur in the art, told Sir Isaac that he must treat the other as a coward by rubbing his nose against the wall. The victor accordingly took the advice, and dragging his victim by the ears, thrust his face against the wall of the church. The success which thus attended his first struggle for superiority induced him to repeat it in a better cause. Although vanquished in the churchyard, his antagonist still stood above him in the school, a victory more honourable than that which Newton had achieved; and though the schoolmaster and his son would have given a different decision on the relative merits of the youthful combatants, yet Newton took the right view of his own position, and resolved to possess the moral as well as the physical superiority. He accordingly exerted himself in the preparation of his lessons, and, after many a severe struggle in which he and his adversary were alternately successful, he not only gained the individual victory, but rose to the highest place in the school.

It is very probable that Newton's idleness arose from the occupation of his mind with subjects in which he felt a deeper interest. He had not been long at school before he exhibited a taste for mechanical inventions. With the aid of little saws, hammers, hatchets, and tools of all sorts, he was constantly occupied during his play-hours in the construction of models of known machines, and amusing contrivances. The most important pieces of mechanism which he thus constructed, were a wind-mill, a water-clock, and a carriage to be moved by the person who sat in it. When a wind-mill was in the course of

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being erected near Grantham, on the way to Gunnerby, Sir Isaac frequently watched the operations of the workmen, and acquired such a thorough knowledge of its mechanism, that he completed a working model of it, which Dr. Stukely says was "as clean and curious a piece of workmanship as the original." This model was frequently placed upon the top of the house in which he lived at Grantham, and was put in motion by the action of the wind upon its sails. In calm weather, however, another mechanical agent was required, and for this purpose a mouse was put in requisition, which went by the name of the miller. It does not distinctly appear how the mouse was compelled to perform a function so foreign to its ordinary habits, but it was supposed to act upon something like a tread-wheel when attempting to reach some corn placed above it; or, according to another supposition, it was placed within a wheel, and by pulling a string tied to its tail, it went forward "by way of resistance," as Dr. Stukely observes, and thus turned the mill.

The water-clock constructed by Sir Isaac was a more useful piece of mechanism than his wind-mill. It was made out of a box which he begged from Mrs. Clark's brother, and, according to Dr. Stukely, to whom it was described by those who had seen it, "it resembled pretty much our common clocks and clock-cases," but was less in size, being about four feet in height, and of a proportional breadth. There was a dial-plate at top with figures of the hours. The index was turned by a piece of wood, which "either fell or rose by water dropping." The clock stood in Sir Isaac's bedroom, and it was his daily practice to supply it every morning with the proper quantity of water. It was frequently resorted to by the inmates of Mr. Clark's house to ascertain the hour of the day, and it remained there long after Sir Isaac went to Cambridge. Dr. Stukely informs us, that having had occasion to talk of clepsydræ, or water-clocks, Newton remarked that their chief inconvenience arose from the furring up of the small hole through which the



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water passed, by the impurities which it contained,—a cause of inequality in its measure of time, the reverse of what takes place in clocks made with sand, which enlarges the hole through which it descends.

The mechanical carriage which Sir Isaac is said to have invented, was a four-wheeled vehicle, and was moved with a handle or winch wrought by the person who sat in it. We can find no distinct information respecting its construction or use, but it must have resembled a Merlin's chair, which is fitted only to move on the smooth surface of a floor, and not to overcome the inequalities of a common road.<sup>1</sup>

Although Sir Isaac was at this time a “sober, silent, and thinking lad,” who never took part in the games and amusements of his school-fellows, but employed all his leisure hours in “knocking and hammering in his lodging-room,” yet he was anxious to please them by “inventing diversions for them above the vulgar kind.” In this way he often succeeded in alluring them from trifling amusements, and teaching them, as Dr. Stukely says, “to play philosophically;” or, as Dr. Paris has better expressed it, in the title of his charming little work, to make “philosophy in sport science in earnest.” With this view he introduced the flying of paper kites, and he is said to have investigated their best forms and proportions, as well as the number and position of the points to which the string

<sup>1</sup> It is a curious fact that Leibnitz, the rival of Newton, had laboured at similar inventions. In a letter written to Sir Isaac from Hanover, about a month after Leibnitz's death, on the 14th November 1716, the Abbé Conti informs him that Leibnitz had laboured all his life to invent machines, which had never succeeded, and that he was particularly desirous of constructing a wind-mill for mines, and a carriage to be moved without horses. Fontenelle, in his Eloge on Leibnitz, mentions these two inventions in different terms. He had bestowed, says he, much time and labour upon his wind-mill for draining the water from the deepest mines, but was thwarted in its execution by certain workmen who had opposite interests. In the matter of carriages, his object was merely to render them lighter and more commodious; but a doctor, who believed that Leibnitz had prevented him from getting a pension from the King of Hanover, stated in some printed work, that he had contemplated the invention of a carriage which would perform the journey from Hanover to Amsterdam in twenty-four hours.—*Mém. Acad. Par.* 1718. Hist. p. 115.

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should be attached. He constructed also lanterns of “crumpled paper,” in which he placed a candle to light him to school in the dark winter mornings ; and in dark nights he tied them to the tails of his kites, in order to terrify the country people, who took them for comets.

Hitherto the attention of Sir Isaac had not been directed to any of the celestial phenomena, and when he did study the apparent daily motion of the sun, he was probably led to it by the imperfect measure of time which he obtained from his water-clocks. In the yard of the house where he lived, he was frequently observed to watch the motion of the sun. He drove wooden pegs into the walls and roofs of the buildings, as gnomons to mark by their shadows the hours and half-hours of the day. It does not appear that he knew how to adjust these lines to the latitude of Grantham ; but he is said to have succeeded, after some years' observation, in making them so exact, that anybody could tell what o'clock it was by *Isaac's Dial*, as it was called. It was probably at the same time that he carved two dials on the walls of his own house at Woolsthorpe ; but, though we have seen them there, we were not able to determine whether they were executed by a tentative process like those in Mr. Clark's yard, or were more accurately projected, from a knowledge of the doctrine of the sphere.<sup>1</sup>

But saws and hammers were not the only tools which our young philosopher employed. He was expert also with his pencil and his pen, drawing with the one and inditing verses with the other. It is not improbable that he received some in-

<sup>1</sup> One of these dials was taken down in 1844, along with the stone on which it was cut, by Mr. Turnor of Stoke Rochford, and presented by his uncle, the Rev. Charles Turnor, to the Museum of the Royal Society. The dial was traced on a large stone in the south wall, at the angle of the building, and about six feet from the ground. The name *Newton*, with the exception of the first two letters, which have been obliterated, may be seen under the dial in rude and capital letters. The other dial is smaller than this, but not in good preservation. The gnomons of these dials have unfortunately disappeared. In the woodcut representing the manor-house of Woolsthorpe, the birthplace of Sir Isaac, are shown the places on the wall where the dials were traced.—See *Phil. Trans.* 1845, pp. 141, 142.