CENTENARIES

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Woodward, Samuel (1790–1838)

SAMUEL WOODWARD, amateur geologist and antiquary, was born at Norwick, October 3, 1790. His father, who was a weaver, died at the age of 33, before Samuel was five years old. Having attended a private school for two years, he went to work with a shawl-weaver. But so desirous was Samuel to learn that he devoted every spare moment to study and read with eagerness every book which came within his reach. In 1804, he joined the service of another local weaver, Mr. Herring, who was wealthy and owned a library. During the next twelve years, when he was working under Herring, Samuel made the fullest possible use of this library. After Herring closed down his business, Samuel worked for six years in the the Northwick Union Fire Office and later entered the Banking house of Messrs. Gurney's & Co., where he remained until his death.

His Hobby

One of the first geological puzzles Samuel endeavoured to solve, was a mass of flint containing *Ananchytes* which he had noticed on a cottage mantle-piece. And one of the books which first excited his attention and perhaps directed it to antiquarian and geological studies was Kerstegan's *Restitution of decayed intelligence in antiquities concerning the most noble and renowned English nation* (1605). Thereafter he commenced to form the extensive collection of fossils and antiquities, which are now deposited in the Norwick museum.

His Publications

In 1824, he made his first communication to the Society of Antiquaries. It consisted of a series of maps and plans of ancient Norfolk. In 1825, he had already completed a *Sketch of the Norwich crag deposit* and his *Remarks on the geology of the county of Norfolk.* His *Geology of Norfolk*, which came out in 1833, contained many accurate drawings of fossils. His *History and antiquities of Norwich castle* was posthumously published in 1847. So also was the case with his *Norfolk topographer's manual* (1842). The number of Woodward's publication reaches 30. Some of them appeared in the *Magazine of natural history* and the *Philosophical magazine.*

His End

His devotion to science and his continuing (after the laborious duties of the day) to spend hours in study undermined his health and he fell a victim to diabetes. Samuel died January 14, 1838.

Morley, Edward Williams (1838–1923)

EDWARD WILLIAMS MORLEY, the scientist, was born in Newark, January 29, 1838. During his early childhood, he suffered much from ill-health. For this reason his early education was undertaken by his father and he was taught at home until the age of nineteen. He learned to read before he was three years old, began Latin at six and Greek at eleven. He found among his father's books one entitled *Conversations on chemistry* which fascinated him more than the *Arabian nights* which stood near it on the same shelf. When twelve years old, he spent all his pocket money on chemical experiments. When he was about fourteen, he mastered a text-book of chemistry by Benjamin Silliman. He graduated from Williams College in 1860 and from Andover Theological Seminary in 1864. He spent a few years as minister.

In 1869, he became Professor of Natural History and Chemistry in Western Reserve College. From 1873 to 1888, he also held jointly the professorship of chemistry in the Cleveland Medical College. He was one of the first to introduce practical chemistry into the curriculum. He found the money for the apparatus for his researches by doing some routine analysis for the local firms.

His Work on Astronomy

From 1860 to 1869, Morley was attracted to astronomy by the inspiration of Professor Albert Hopkins. He mounted a transit instrument, constructed a chronograph and made the first accurate determination of

the latitude of the college laboratory. This was the subject of his first paper, which was read before the American Association for the Advancement of Science in 1866. Laplace's *Mecanique celeste* fascinated him during this period.

Loomis-Morley Hypothesis

His main interest was however in chemistry. In 1878, his attention was directed to reported variations in the proportion of oxygen in the atmosphere. For three years he pursued the subject. He made analysis of the amount of oxygen in the air on 110 consecutive days. This corroborated the Loomis-Morley hypothesis according to which the deficiency of oxygen was supposed to occur at times of high barometric pressure, due to downward currents bringing air from high altitudes.

Composition of Water

The outstanding labour of his life is his work on the density of oxygen and hydrogen and the ratio in which they combine. He was occupied with this investigation for about twelve years and the results were published in 1895, as Smithsonian contribution to Knowledge, No. 980, and also appeared in German in the *Zeitschrift fur physikalische chemie*. This research placed him at the very first rank of scientists. It is a remarkable tribute to his accuracy that even now the accepted values of these quantities are practically identical with those found by him.

His Work in Physics

Morley was as eminent a physicist as chemist. His characteristic for precision is exhibited by his early papers on *Ruling on glass* and the *Probable error of micrometric measurements*. His joint work with Michaelson on the relative motion of the earth and the ether and his later work on the drift of the ether in collaboration with D. C. Miller are well known.

His Honours

Morley contributed about fifty-five papers. He became President of the American Association for the Advancement of Science in 1895 and of the American Chemical Society in 1899. He was awarded the Sir Humphrey Davy Medal by the Royal Society (1907), the Elliot Creson Medal of the Franklin Institute (1912) and the Willard Gibbs Medal by the American Chemical Society (1917). In 1912, he was Honorary President of the Eighth International Congress of Applied Chemistry. He received honorary degrees from several Universities and was an honorary member of several learned bodies.

His Library

Very early in his career, Morley realised the importance of books in enabling one to keep abreast of the work being done in one's science. Since his college was unable to purchase books for him, he began to collect a library of the principal chemical periodicals and soon he had the biggest collection of them in the whole of America. On his retirement in 1906, his college purchased the library from him.

Morley died after an operation, February 24, 1923.

Eros Approaching.

ASTRONOMERS are beginning to turn their telescopes toward Eros, the small planet which is one of the earth's nearest neighbours in the Solar System. In January this tiny celestial visitor will come within 20,000,000 miles of the earth.

Eros is peculiar in that it, instead of being rounded, seems to resemble a gigantic slab of stone some 22 miles long by only about seven miles in width and thickness. This elongated world keeps tumbling over and over in space like an athlete turning handsprings.

So reports Fletcher Watson Jr., of the Harvard Observatory, in studies which provide an instance of how modern astronomy manages to learn much about an object almost too faint to be seen at all. The orbit of Eros brings it reasonably close to the earth every few years. When this happens the brightness of the small world is found to vary in a cycle of about five hours believed to be due to its rotation. Studying all recorded observations of these light changes, Mr. Watson deduces the elongated shape and other probable characteristics.

Eros apparently is made of some brownish or yellowish rock or similar substance, is about the same all the way through and revolves around an axis perpendicular to its greatest length, like a dumb-bell tumbling end over end.—*The Sky*, 1937, **2**, No. 11, 27.