William Rowan Hamilton

King of Quaterions

"On earth there is nothing great but man; in man there is nothing great but mind."

Abir G

His Achievments

In 1835 Hamilton was knighted by the Lord Lieutenant of Ireland in the course of a meeting in Dublin of the British Association for the Advancement of Science. Hamilton served as president of the Royal Irish Academy from 1837 to 1846. Hamilton had a deep interest in the fundamental principles of algebra.

On 16 October 1843 (a Monday) Hamilton was walking in along the Royal Canal with his wife to preside at a Council meeting of the Royal Irish Academy. Although his wife talked to him now and again Hamilton hardly heard, for the discovery of the quaternions, the first noncommutative algebra to be studied, was taking shape in his mind:

"And here there dawned on me the notion that we must admit, in some sense, a fourth dimension of space for the purpose of calculating with triples … An electric circuit seemed to close, and a spark flashed forth."

Hamilton retained his faculties unimpaired to the last, and continued the task of finishing the

$$i^2 = j^2 = k^2 = ijk = -1$$

Elements of Quaternions which had occupied the last six years of his life. He died on 2 September 1865, following a severe attack of gout.

Discovering Quaternions

Quaternions are a non-commutative number system that extends complex numbers. While described in all but name by Olinde Rodriguez in 1840, Sir William Rowan Hamilton is credited with their discovery from 1843.

In 1843, Hamilton knew that the complex numbers could be viewed as points in a plane and that they could be added and multiplied together using certain geometric operations. Hamilton sought to find a way to do the same for points in space. Points in space can be represented by their coordinates, which are triples of numbers and have an obvious addition, but Hamilton had difficulty defining the appropriate multiplication.

According to a letter Hamilton wrote later to his son Archibald: Every morning in the early part of October 1843, on my coming down to breakfast, your brother William Edwin and yourself used to ask me: "Well, Papa, can you multiply triples?" Whereto I was always obliged to reply, with a sad shake of the head, "No, I can only add and subtract them."

On that day walking with his wife along Royal Canal, he realised that since he could not multiply triples, he could try multiplying quadruples. He worked out he could represent points in space using this system. In excitement, he carved the basic rules into Brougham Bridge, now Broom Bridge, which still has a commemorative plaque.

Sir William Rowan Hamilton was both an incredible mathematician and astronomer. He had discovered Quaternions which are vital for the controls which guide aircraft and rockets, and in quantum mechanics. He was a very intelligent person and his life achievements will not be forgotten. ■