Sir William Rowan Hamilton

ALSO LISTED IN	Mathematicians, Physicists, Astronomers
FAMOUS AS	Physicist, Astronomer and Mathematician
NATIONALITY	Irish
BORN ON	04 August 1805 AD Famous 4th August Birthdays
ZODIAC SIGN	Leo Leo Men
BORN IN	Dublin
DIED ON	02 September 1865 AD
PLACE OF DEATH	Dublin
FATHER	Archibald Hamilton
CHILDREN	William Edwin Hamilton
EDUCATION	Trinity College, Dublin, Westminster School
DISCOVERIES / INVENTIONS	Icosian Calculus, Quaternions

One of the most significant Irish scientists, William Rowan Hamilton made noteworthy contributions in the field of classical mechanics, algebra and optics. What is interesting to note is that Hamilton, from the tender age of five, showed signs of making it big in the world. His immense talent was appropriately nutured right from the very beginning, which further enhanced his capabilities. While Hamilton is known to have contributed in various fields, it is his work in the reformulation of Newtonian mechanics, now called Hamiltonian mechanics, that tops the list. This work proves to be the foundation of the modern study of classical field theories such as

electromagnetism, and to the development of quantum mechanics. To know more about this inventor of quaternions, read through these following lines
Read more at http://www.thefamouspeople.com/profiles/sir-william-rowan-hamilton-552.php#iuXGSOUIAGoUJwQc.99

Introduction To Mathematics

Hamilton's formal introduction to mathematics came the following year, in 1818, when he studied Clairaut's Algebra. His mastery over French made it somewhat easier for him to understand the concept. By the age of fifteen, he started studying the works of Newton and Laplace. During this time, Hamilton was also involved in preparations for entrance at the Trinity College, Dublin. At the age of 18, Hamilton found himself a seat at the Trinity College and in his very first year, acquired 'optime' in Classics, a distinction awarded only once in twenty years. Hamilton submitted his first paper to the Royal Irish Academy in the year 1824, entitled, On Caustics. His progress somewhat declined the following year, with him earning grade 'bene' instead of the usual 'value bene'. However, Hamilton soon bucked up and in 1826, again amazed everyone by bagging an 'optime' in both science and Classics, a feat unheard of. In the final year as an undergraduate, Hamilton presented a memoir, Theory of Systems of Rays, to the Royal Irish Academy. It was in this paper that Hamilton introduced the characteristic function for optics.

His Trysts

During this time, the post of Andrews Professorship of Astronomy was vacant in the University of Dublin. Under the persuasion of Boyton, Hamilton's finals examiner, the latter applied for the position, in spite of knowing that already six applicants had applied for the vacancy. In 1827, a little prior to his graduation, Hamilton was offered the position of Professor of Astronomy. This appointment not only meant Hamilton having the honorary title, Royal Astronomer of Ireland, but also allowing him the benefit of staying at the Dunsink Observatory. However, this selection invited a great deal of criticism and controversy, since Hamilton did not have much experience in the field.

Hamilton's predecessor, Dr. Brinkley, pointed out the fact that Hamilton's decision was incorrect and that he should have waited for a fellowship. Hamilton's newest acquisition of the chair of professorship, however, did not upgrade his level of intellect much. This was due to the fact that although Hamilton had insightful knowledge of theoretical astronomy, he had little or no knowledge of the regular work of the practical astronomers. Also, Hamilton had a belief that he could do wonders in the field of research than being engaged in observation. The authorities of the university, however, thought otherwise. If Hamilton dedicated himself thoroughly to practical astronomy, they assured to provide him with the best and the most advanced of instruments and adequate staff members.

His Contributions in Optics & Mechanics

The same year, i.e. in 1827, Hamilton presented a theory of a single function, now known as Hamilton's principal function. The theory brought together mechanics, optics and mathematics, thus helping establish the wave theory of light. The Royal Irish Academy paper was entitled Theory of Systems of Rays, with the first part being printed in 1828 in the Transactions of the Royal Irish Academy. The second and the third part were printed in three voluminous supplements, which were published in Transactions as well as in the two papers On a General Method in Dynamics, which appeared in the Philosophical Transactions in 1834 and 1835. it was

in these editions that Hamilton's formulation of the concept of "Varying Action" was mentioned. According to this theory, a single ray of light entering a biaxial crystal at a certain angle emerged as a hollow cone of rays. This breakthrough is still known by its original name, "conical refraction".

One thing that was common in all Hamilton's research was that they were, somehow or the other, based on the principle of "Varying Action". While the principle is based on the calculus of variation, it, however, revealed a detailed mathematical structure than that had been previously understood. Though Hamilton's take on classical mechanics is based on the same physical principles of Newton and Lagrange, it provides a powerful new technique for working with the equations of motion. Both Lagrangian and Hamiltonian approaches were initially developed to describe the motion of discrete systems and have proven to be critical in the study of continuous classical systems in physics, and even quantum mechanical systems. As such, the techniques are still in use in electromagnetism, quantum mechanics, quantum relativity theory, and quantum field theory.

Read more at http://www.thefamouspeople.com/profiles/sir-william-rowan-hamilton-552.php#iuXGSOUIAGoUJwQc.99

His Contributions in Quaternions

Hamilton's another greatest contribution in the field of mathematical science was his discovery of quaternions in 1843. In this, Hamilton was looking for ways to extend complex numbers to higher spatial dimensions. While he failed to successfully find a three-dimensional system, he effectively created the four-dimensional system, wherein which he created quaternions. Interestingly, Hamilton's formulation of the equation came when he was walking with his wife along the Royal canal. Fearing that he might forget the equation by the time he got back home, he carved the same into the side of the nearby Broom Bridge, using his penknife. This marked the discovery of the quaternion group.

Hamilton described a quaternion as an ordered four-element multiple of real numbers, and described the first element as the 'scalar' part, and the remaining three as the 'vector' part. As a method of analysis, Hamilton introduced both quaternions and biquaternions, as the extension to eight dimensions by establishment of complex number coefficients. Hamilton had declared that the quaternions would play a pivotal role as an instrument of research. During his end days, Hamilton was working on a definitive statement of quaternion science. Posthumously, his son published Elements of Quaternions, a hefty volume of 762 pages, in 1866. Today, the quaternions are used in computer graphics, control theory, signal processing, and orbital mechanics, mainly for representing rotations/orientations.

Read more at http://www.thefamouspeople.com/profiles/sir-william-rowan-hamilton-552.php#iuXGSOUIAGoUJwQc.99