# THOMAS CHARLES HOPE (1766–1844)

THE memory of the birth of Thomas Charles Hope, said to be one of the most popular teachers of science ever to have lived in Great Britain, seems to have been eclipsed by the birth, in the same year, of Dalton the famous philosopher, and Wollaston the genius of experiment and invention.

Thomas Charles was born 21 July 1766, son of Dr. John Hope who was Professor of Botany in the University of Glasgow. After being educated at the High School of Edinburgh and a school in Dumfries, he entered Glasgow University at the age of thirteen to study literature. In June 1787 he gained the degree of Doctor of Medicine and four months later succeeded Dr. Irvine to the Lectureship in Chemistry. A year earlier he had become a Fellow of the Royal Society of Edinburgh. His immediate predecessors—Robinson, Black and Cullen—were such as to make any successor feel overawed and inferior, but the thought of these eminent teachers of chemical science only stimulated Hope to make every effort to prove himself worthy. He was well acquainted with general doctrines of chemistry and possessed a flair for devising illustrative experiments and a rare delicacy in chemical manipulation. His use of these talents in the teaching of chemistry made him an exceedingly popular lecturer during his short period at Glasgow.

One of his main aims was to combine the practice of medicine with his chemical labours and in 1789 he became assistant Professor of Medicine. For two years, as well as lecturing on chemistry, he taught the theory and practice of medicine. On the death of his uncle, in 1791, he became Professor of Medicine and resigned his lectureship in chemistry; he continued however his private chemical research. His success as a lecturer was such that in 1795 he was invited to relieve Black of some of his teaching duties by becoming his assistant in the Chemistry Department of Edinburgh University. In 1796 Black decided to give up lecturing and introduced Hope as his successor in the following way: 'After having, for between thirty and forty years, believed and taught the chemical doctrines of Stahl, I have become a convert to the new views of chemical action; and subscribe to almost all Lavoisier's doctrines; and scruple not to teach them. But they will be fully explained to you by my colleague and friend Dr. Hope, who has had the advantage of hearing them from the mouth of their ingenious author'.[1] After being introduced to the ideas of Lavoisier by Sir James Hall, Hope had spent a summer in Paris where he struck up a friendship with the great scientist, possibly due to his having been the first chemist to teach Lavoisier's ideas in Britain.

In 1796 he became a Fellow of the Royal College of Physicians of Edinburgh and for many years took his share of the duties of a Clinical Professor of Medicine. In 1799, on the death of Black, Hope became the sole Professor of Chemistry.

By the turn of the century he had become the most popular teacher of science Britain had ever known. Not only was his lecture room crowded with medical students from every part of the British Isles but numerous foreigners went to Edinburgh to become his pupils. So great was the appeal of his lectures that those who did not arrive early willingly stood through the session. Along with people like Fyfe, Reid, Christison,

Traill and Grant, he also attracted the nobility — men such as the Earl of Lauderdale, Lord Maitland, Lord Sempsill and Lord Ashburton.

Some idea of his popularity can be seen from the numbers of students who attended his classes. In the six years preceding Hope's appointment the average yearly attendance was 225, in 1800 it had risen to 400, by 1813 to 500, with a maximum of 575 by 1827. During his time, 16,500 students had attended his lectures. Their impact was such that in 1800, at the request of the Faculty of Advocates, he gave a summer course in chemistry.

In 1804 he was appointed a representative by the University of Edinburgh to a meeting of the Scottish Universities who were concerned about the standard of their medical degree. Hope submitted to the gathering that no person should be received as a candidate for the degree of Doctor of Medicine unless he produced certificates stating that he had studied at a celebrated university or medical school during the full medical session and had attended lectures in Anatomy, Chemistry, Materia Medica, Institutions of Medicine, Practice of Physic and Botany if given.[2] It was said that by adopting the above regulations the standard of the degree at Glasgow improved.

An idea of what it was like to attend his lectures can be seen from the following two passages taken from the works of two of his students.[3,4]

> He abandoned the career of investigation and made it his chief aim to improve the mode of lecture and make science more attractive. His manner and diction were pompous but this was more than counterbalanced by uncommon clearness of exposition and unexampled splendour, and success of experimental demonstration. To be visible to a class of 500 students his experiments required to be performed on a very large scale which everyone conversant with experimental lectures knows to increase greatly the difficulty of exact manipulation. Nevertheless when I [Grant] attended Hope in 1814 there was not a single failure to attain exactly what was announced. The only deficiency in his system was he gave no opportunity to practical instruction.

> Sir Robert Christison says that no study interested him more during his student days at the university than that of chemistry. When he attended in 1814 there was not a single failure to attain exactly what Hope announced; and on repeating the course in 1815 he failed only once. That failure was an egregious one. In order to show the great cold produced by snow melted by nitric acid, he used a large inverted glass bell-jar instead of a strong-footed one, his usual apparatus. The powerful cold at once froze the surface into a firm spongy cake. Endeavouring to break up this covering with a heavy glass rod, the rod suddenly plunged through the consolidated mass, and through the bottom of the jar also. The acid—now fortunately, dilute acid—overflowed the table and gushed over the Doctor's then fashionable black stocking-piece pantaloons, which instantly 'like lobster boiled, from black to red, began to turn', amidst shouts of student-laughter and a hasty retreat on the part of Dr. Hope in great quest of ammonia to repair the damage.

Although normally pompous in manner and correct in speech, Hope did sometimes forget himself. During one of his lectures an unruly student threw a handful of peas at the professor and some struck him in the face. He started to reprimand the offender in dignified language, but suddenly lapsed into broad Scots as follows: 'Such conduct is unbecoming of a gentleman and moreover—it's daumed sair!'[5]

In 1810 he became a Fellow of the Royal Society and in the following year wrote to Dalton informing him that he did not accept his theory. 'I am by no means a convert to your doctrine, and do not approve of putting the results of speculative reasoning as experiment, whilst I admire the ingenuity of your speculations.'[6]

Hope disagreed with Rumford over the idea that liquids were absolute non-con-

ductors, which Hope had shown not to be the case. Nevertheless, although at a difference with Rumford, it was Hope who suggested that Davy be invited to fill the vacancy at the Royal Institution.[7] Davy never heard Hope lecture, but his brother (and biographer) became a student of Hope.[8]

In 1815 Hope became President of the Royal College of Physicians of Edinburgh, an office which he held for four successive years. Whilst thus connected with the College of Physicians he took an active part in the preparation of the ninth and tenth editions of their *Pharmacopœia*. For many years, as well as fulfilling his duties as Professor of Chemistry, he gave an annual course in clinical medicine which was well attended. However by now he had handed over to his younger colleagues the more arduous duties of the Infirmary and clinical instruction.

In 1820 he became an honorary member of the Royal Irish Academy and in 1823 a vice-president of the Royal Society of Edinburgh—a position which he occupied until his death.

In 1826 he gave a short course of lectures to ladies and gentlemen. The proceeds of these lectures—£800—he presented to the University for a chemical prize to be awarded annually to the author of the best essay on a chemical subject.

He had little time for research and to counter any accusation that might have been levelled against him, he made the following statement:

> Those . . . who devote themselves to the science of chemistry, may be divided into two classes—1st, those whose labours are employed in original researches, to extend our knowledge of the facts and principles of science. Secondly, of those whose business it is, from university or other appointments, to collect the knowledge of all that has been discovered, or is going forward in the science, to digest and arrange that knowledge into lectures, to contrive appropriate and illustrative experiments, and devise suitable apparatus for the purpose of communicating a knowledge of chemistry to the rising generation, or others who may desire to obtain it. From my professional situation, I consider myself, as Dr. Black had done before me, as belonging to the second class of chemists. I consider my vocation to be the teaching the Science.[1]

Nevertheless he was not deficient in the powers of investigation and his name is usually associated with his two major discoveries. He isolated and named the first known compound of strontium[9] and investigated the compounds of barium, obtaining baryta by heating the carbonate in a plumbago crucible.[10] In his famous experiment—the well-known Hope's experiment—he gave an account of the determination of the maximum density of water and also an explanation as to the reason why icebergs float.[11] It was not until his penultimate year that he made further communications. Two dealt with the constitution of the colouring matters in the leaves and flowers of plants[12,13], and the third discussed the temperature phenomena of the famous freezing cavern at Orenberg.[14]

In the summer of 1844 (13 June), he died. Hope never married and it was said that the department was his wife and his pupils were his family. His place in the history of the teaching of science in this country is assured and makes him worthy of remembrance.

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## ORIGIN AND MEANING OF THE NAME 'CAROTIS'

THE terms *carotis-arteria carotidea—sinus caroticus* have long been established in anatomical nomenclature. I once asked myself what is the meaning and origin of the name 'carotis'? Why have the other arteries mostly a name related to the organ with which they are connected and why are the arteries in the neck called the 'carotid arteries'? As I did not know the answer to these questions, I had to investigate.

The first quotation concerning the function of the arteries in the neck of man appears in a publication of Aristotle (384-322 B.C.).[1] In the translation of his *Parva Naturalis* it is stated 'also pressure on the veins (vessels) of the neck causes unconsciousness (fainting, sleep)'. It seems therefore that the term 'carotis' comes from the Greek word *karos* meaning 'soft, sleep' and was already used in anatomy before Aristotle.

This origin and meaning of the term 'carotis' was confirmed by Rufus of Ephesus (A.D. 98-117). In the French translation of the writings of Rufus[2] it is stated 'On a autrefois appliqué le nom d'assoupissants (carotides) aux vaisseaux qui montent à travers le cou, parce qu'en les comprimant on produit l'assoupissement et l'aphonie, mais on sait aujourd'hui que ces symptomes résultent de la compression des nerfs et non pas de celle des vaisseaux, de sorte qu'on ne ferait pas mal si on pensait devior changer ce nom'. In my opinion, the statement of Rufus is correct, because compression of the arteries in the neck of man does not induce sleep, but compression of the