



## Private prescription:

A thought-provoking tonic on the lighter side

Column by Raymond C. Rowe, AstraZeneca, UK

Please note that these are the personal opinions of the author and do not necessarily represent those of AstraZeneca.

# Michael Faraday – an inspiration to all scientists

I have always found the story of Michael Faraday's life and work one of the most fascinating and inspiring in the annals of science. He was born the son of a blacksmith near London in 1791. His early education was rudimentary, consisting of little more than the basics of reading, writing and arithmetic. He left school at the age of twelve and started work, first as an errand boy and then as an apprentice bookbinder. Despite this humble background, Faraday became one of the most pre-eminent scientists of his age, if not of all time. Such was his output and diversity of skills that modern chemists, physicists, engineers and material scientists all regard him as one of the founders of their subjects. Few names are encountered more frequently by science students than his. To understand the secret of his success one must examine his life in more detail.

Faraday's interest in science started after he had read an article on electricity in a copy of Encyclopaedia Britannica, 3rd edition published in 1797 (Ref. 1). In 1812 he was given a ticket to attend the last four lectures of a course given by Sir Humphry Davy at The Royal Institution in London, UK. He was so motivated

by these that he made copious notes and produced a bound copy with illustrations and presented it to Davy, who was so impressed that he took Faraday on as his assistant helping with both lecture experiments and research. In essence, Davy became his mentor, and a better one no scientist could hope for at that time. Davy was a brilliant, well-respected scientist with contacts at the highest level of society across Europe. His reputation was second to none. In 1813 Faraday accompanied Davy on a lecture tour of Europe during which they prepared the explosive nitrogen triiodide in Paris, studied the electrical discharge of the torpedo fish in Genoa and burnt a diamond in Florence. This was, to all intents and purposes, Faraday's university education.

### Faraday's philosophy

Faraday was tenacious in his beliefs and philosophy as shown in the following declaration: 'A philosopher should be a man willing to listen to every suggestion but determined to judge for himself. He should not be bound by appearances, have no favourite hypothesis, be of no school and in doctrine have no master.

He should not be a respecter of persons, but of things. Truth should be his primary object.'

This open-mindedness allowed him to engage in many fields of science or, as he preferred to call it, natural philosophy, ranging from metallurgy, synthetic chemistry, analytical chemistry, electrochemistry, catalysis, electricity, magnetism, electrostatics and colloids. In all, he published 450 original papers and several books but in none did he ever present a single differential equation, for he knew no mathematics! However, he had a flair for experimentation and was a keen observer. He built his own equipment and designed and constructed his own measuring instruments (these were generally more sensitive and of superior quality than those of his contemporaries). His laboratory notebooks were full of detail including experimental failures, as well as successes, together with his thoughts and conclusions. He was extremely hard working, often spending 14 hours a day in his basement laboratory at The Royal Institution. He had little compunction about declining high honours (he declined the Presidency of both the Royal Society and the Chemical Society) and in turning down social engagements, as this would interrupt his work in the laboratory.

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*What was unique of the man two hundred years ago is still relevant today.*

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### A brilliant communicator

Faraday was endowed with a compulsive urge to write and communicate. He was a brilliant lecturer and took great trouble to make both his and the discoveries of others intelligible to the layman. He once wrote that 'a truly popular lecture cannot teach, and a lecture that teaches cannot be popular'<sup>1</sup>. He introduced the concept of evening lectures but insisted that 'they should amuse and entertain as

well as educate, edify and, above all, inspire' – a principle he always adhered to, especially when delivering his Christmas Lectures. It is interesting to note that this is still the principle that governs the Royal Institution Christmas Lectures for young people.

Faraday was always willing to give advice and his general comments on the lecturer's art are still relevant today. For instance, on diction he wrote: 'In order to gain the attention of the audience (and what can be more disagreeable than the want of it), it is necessary to pay some attention to the manner of expression. The utterance should not be rapid and hurried, and consequently unintelligible, but slow and deliberate, conveying ideas with ease from the lecturer and

infusing them with clearness and readiness into the minds of the audience.' On the length of lectures, he advised: 'I disapprove of long lectures. One hour is enough for anyone, and they should not be allowed to exceed that time.'

### Faraday's genius

Hence, Faraday's genius was the consequence of a unique combination of qualities – prodigious intellectual energy, a deeply held belief in what is required of a scientist, endless curiosity, a mastery of detail, an aptitude for experimentation and the ability to communicate at all levels. A detailed examination of modern management handbooks would show that these are the competencies demanded of scientists in the pharmaceutical

industry. I recommend all scientists who wish to become successful in their career to study the life and work of Michael Faraday, for what was unique of the man two hundred years ago is still relevant today. He is, without doubt, an inspiration to all scientists.

### Reference

- 1 Thomas, J.M. (1991) *Michael Faraday and The Royal Institution – The Genius of Man and Place*. Adam Hilger, IOP Publishing, Bristol, UK

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