Early clinical pathologists 4: John Hunter (1728-1793)

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[In modern physics], one has now divided the world not into different groups of objects but into different groups of connections . . . What can be distinguished is the kind of connection which is primarily important in a certain phenomenon . . . The world thus appears as a complicated tissue of events, in which connections of different kinds alternate or overlap or combine and thereby determine the texture of the whole.

W Heisenberg¹

It should be remembered that nothing in nature stands alone; but that every art and science has a relation to some other art or science, and that it requires a knowledge of these others, as far as this connection takes place, to enable us to become perfect in that which engages our particular attention.

John Hunter²

St George's Hospital is indeed proud to have had John Hunter among its list of distinguished members of staff, and his bust sits majestically in the foyer of the new medical school. Yet the description on this bust, "John Hunter, Surgeon 1768-1793," will deceive generations of medical students into believing that his immense contribution was confined to one specialty. John Hunter did not restrict his interests to one organ, one part of

the body, or even simply to man: he wanted to know everything and he pursued the whole of nature with the same vigour that he showed in his surgical practice.

John Hunter, son of John Hunter, was born in Long Calderwood in Scotland on 14 February 1728, the last of 10 children. (It is said that the 13th is recorded as his birth date in the parish church but Hunter observed the 14th, and it is on this day that the Hunterian Oration takes place at the Royal College of Surgeons.)³ Hunter spent the first 20 years of his life at Long Calderwood and his childhood has often been described as lacking in self-control, idle, and rebellious towards school, an attitude not becoming a young man whose father was a respectable gentleman and whose brothers were studying medicine and law. This was also in stark contrast to the energy and aptitude he showed in later years. This mistaken image of a wasted youth has arisen from his own words:

"When I was a boy, I wanted to know all about the clouds and the grasses, and why the leaves changed colour in the autumn; I watched the ants, bees, birds, tadpoles and caddisworms; I pestered people with questions about what nobody knew or cared anything about."⁴

This last sentence is very revealing as Hunter spent his youth fascinated by the nature around him while his elders wanted him to conform to a rigid educational system. It is not surprising, then, that in the eyes of many people he indeed had a wasted youth.

It is difficult to talk about John Hunter without mentioning his famous brother William. Their lives were intimately intertwined and William had a big hand in the initial success of his brother. The two brothers started working together in 1748 following John's arrival in London. William put him in charge of the dissecting room of his anatomy school and the following year John advanced to demonstrator to the medical students. The next three years formed the basis for his mastery over anatomy. During this time he also spent some time learning hospital practice under Dr Cheselden. In 1751 Cheselden died and John Hunter enrolled as a surgeon's pupil to Percival Pott at St Bartholomew's Hospital, who was the leading surgeon at this time. John's commitments to the hospital left him little time for dissecting and demonstrating at his brother's school. He had to make a decision about his future as in order to qualify as a surgeon he would have to apprentice himself fully for five years. The

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Figure 1 (Courtesy of Dr C Finlayson, St George's Hospital Medical School).

rules at St George's Hospital were not so inflexible and it was here that he took up his apprenticeship in 1754. He was appointed house surgeon in 1756, a post he held for five months.

Apart from this short period in clinical work, Hunter spent most of his time from 1756–1759 in the study of anatomy, including comparative anatomy. Of his work, Everade Home says:

"It was not his intention to make dissections of particular animals, but to institute an enquiry into the various organisations by which the functions of life are performed, that he might thereby acquire some knowledge of general principles. This, I believe, had never been attempted, or certainly never been carried far into execution . . . He applied to the keeper of wild beasts in the Tower for the bodies of those who died there, and he made similar applications to the men who showed wild beasts . . ."

For reasons that are not entirely clear, he enlisted in the army in 1760. England was at war at the time and Hunter spent the next three years caring for the soldiers plagued with war injuries and fevers. He did, however, come into contact with sea birds and marine creatures and hence started his interest in marine biology. Even before Darwin he had begun to consider that animals could be classified into a phylogenetic series. Hunter returned to England in 1763 and set up home in Golden Square and started his surgical practice.

During the time that he set up practice, treatment was based on individual experience and John Hunter realised quickly that what was required was no more or no less than a total understanding of life; an understanding of both normal physiology and of the processes of disease, both in humans and in the entire animal kingdom. It was to this task that he now set himself. Hunter again let it be known that he was looking for animals. To keep them he needed a place outside London, and in 1764 he bought some land in Earls Court, which at that time was two miles outside London. *The Morning Post* of 30 August 1793, a few weeks before his death, says: "In the gardens of Mr John Hunter, Surgeon, at Earls Court, are seen buffaloes, rams, and sheep from Turkey, and a shawl goat from the East Indies, all feeding together in the greatest harmony; besides a prodigious variety of other beasts and birds supposed to be naturally hostile to each other." The Earls Court house was also the place that he brought his bride Anne, the daughter of Robert Home. They had four children, all born during the first four years of their marriage.

It is difficult to do justice to Hunter's contribution to medicine in an article such as this. In 1766 he ruptured his Achilles tendon. In true Hunterian style he observed his own injury and later undertook experiments in dogs to work out the process of healing and repair. By cutting the tendons and subsequently observing the process at different intervals, he was able to show that healing took place by

formation of a scar, similar to that in bone.

He is, of course, remembered for the auto experiment of inoculating himself with gonorrhoea pus. The signs and symptoms of gonorrhoea appeared quickly, to be followed by those of syphilis. The diseases were treated with local cauterisation, chemical burning, and mercury. Until the discovery of Penicillin by Alexander Fleming, every medical student was aware that a night with Venus might mean a year with mercury! Hunter contracted both gonorrhoea and syphilis and he therefore believed wrongly that they were both part of the same disease. Despite this mistake, what Hunter eloquently showed was that to understand a chronic disorder you need to make continuous or repeated observations from the time of acquiring the disease to its conclusion. Hunter was unlucky to use pus from a patient who had both diseases. Hunter also had the insight to realise that the process of inflammation was necessary for the cure of the patient but that it also did harm, and that some of the symptomatology of the inflammation became the symptoms of the "disease". His *A treatise on blood, inflammation, and gunshot wounds* is a monument to his work on the elucidation of the basic principles of inflammation and disease.

Another of Hunter's contributions was the demonstration of collateral circulation. He tied one of the carotids in a stag from Richmond Park and observed the effects on the corresponding antler. As expected the pulse on that side disappeared and that antler went cold and stopped growing. But within a few weeks, the warmth returned and the antler started growing. When the animal was sacrificed and the carotids injected, the collateral vessels were shown. Hunter used this information later to devise an operation to bypass vascular aneurysms.

In 1776 John Hunter also carried out probably the first artificial insemination. He was consulted by a man with hypospadias which made it impossible to impregnate his wife. Hunter used a warm syringe to inseminate the man's sperm into the cervix. The outcome was a successful fertilisation.

Transplantation also did not escape him. Of this he said, "the most extraordinary of all circumstances respecting union is by removing a part of one body, and afterwards uniting it to some other part of another . . . Teeth after having been drawn and inserted into sockets of another person, unite to the new socket, which is called transplanting." His experiment of transplanting a human tooth into the centre of a cock's comb can be seen at the Hunterian Museum.

The story of Charles Byrne, the Irish giant, has been told many times, and although it reflects a man's desire to pursue science at any cost, it is still a story of body snatching. Charles Byrne, who was eight feet two inches, had come to London to exhibit himself at fairs and theatres. After initial success the curiosity vanished and Byrne took to drink. It wasn't long before he contracted tuberculosis and lay dying. John Hunter, who had been interested in him now wanted his skeleton and made no

Figure 2 From the portrait of John Hunter painted by Joshua Reynolds and engraved by William Sharp.

secret of it. Byrne was petrified at the thought of his body being mutilated by the great surgeon and had arranged with his friends to have his body sealed in a lead coffin and buried at sea. With £500 worth of bribery, however, Hunter managed to get his way and Byrne's name has been immortalised. Many visitors to the Hunterian Museum have wondered about the brown discolouration of the skeleton; this was caused by the rapid boiling of the flesh during the preparation of the skeleton.

John Hunter's contribution was not just confined to his own work. He motivated and encouraged others to adopt the same enquiring attitude. The most famous of these was Edward Jenner, who enrolled as his pupil in 1770 at the age of 21. Jenner lived with Hunter for two years and the friendship and bond that developed remained even when Jenner had moved into general practice in Gloucestershire. The two corresponded regularly, on almost any matter that they could work on together. On one such occasion, when Jenner had written to Hunter to ask his opinion about an idea, Hunter replied, "... I think your solution is just; but why think? why not try the experiment? ..."³ Hunter undoubtedly had a profound effect on Jenner, but Hunter did not live to see his friend present his paper on vaccination to the Royal Society in 1796. It wasn't until 1798 when he published his book *An inquiry into the causes and effects of the Variolae vaccinae* that his ideas began to be taken seriously.⁵

John Hunter's association with St George's Hospital started in 1768 and he was surgeon to the hospital for 25 years. When he came on to the staff, the other surgeons were Caesar Hawkins, William Broomfield, and John Gunning. At this time, St George's was 32 years old. There was no medical school in the formal sense, no special departments, no museum, no classes, no formal lectures and no hospital examinations. John Hunter had many disputes with his colleagues about doing more for students and a proposal to create a medical school was put forward in 1783. Sad to say it was not approved by Hunter's colleagues. His battles with his colleagues continued till the end. The final confrontation took place at the boardroom at St George's on 16 October 1793. He had put forward a proposal to admit two pupils, neither of whom possessed a certificate to state that they had been "bred up to the profession". One of his colleagues contradicted a statement that he made in support of the pupils and in a rage of fury he stormed out of the room. He had suffered from severe angina since the age of 57 and this confrontation was the final straw. He collapsed into the arms of a physician who was standing nearby and died.

It is not possible to label Hunter as a biologist, physician, surgeon, pathologist or anything else without losing something in the labelling. Hunter kept many different weird and wonderful animals; I often wonder if he had kept zebras. If he did, he may have pondered if they were black with white stripes or white with black stripes. Whether he did or not, he seemed to have discovered that to ponder over stripes in isolation from the whole zebra was to miss the point. The stripes are only important in so far as they are part of the whole. To go to the fun fair and concentrate on the horse on the merry-go-round is to miss the thrill that comes from the movement. I believe that John Hunter, while trying to understand the mechanism of life, retained the thrill that comes from feeling the movement of life.

The heart of the matter is education. It is the total understanding of man and not an emphasis on one fragment of his life.

J Krishnamurti⁶

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