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Tropical Medicine: the Hot Scots

The role of Scots as explorers, inventors and entrepreneurs is well established. For a small nation on the periphery of northern Europe, Scotland has contributed far more than its fair share to global development. Perhaps less well known and less expected are the country's credentials as a leading centre for the study and treatment of tropical disease. But the names Manson, Ross and Bruce have a fair claim to join those of more celebrated Scots like Livingston, Fleming and Carnegie. As a result of the work they undertook, millions of lives have been saved. And the cutting edge science they pioneered continues to this day.

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The Royal Society of Tropical Medicine and Hygiene, one of the foremost centres in the world, is now entering its second century, having been founded in 1907. It is perhaps fitting that the founders of such a significant institution had very strong Scottish connections, given Scotland's long renowned reputation for medical and surgical expertise.

Sir Patrick Manson was the first president of the RSTMH. Known as the 'father of tropical medicine', Aberdeenshire-born Manson was in many ways the obvious choice. He had worked extensively as a physician in the Far East for three decades, first as an advisor to the Chinese Imperial Maritime Customs and then as a doctor in Hong Kong. Frustrated by the lack of knowledge around him, Manson set out to establish the causes of malaria, a scourge for both the local people and the Europeans living there.

Manson continued his research after his return to Britain and in 1899 joined the Seaman's Hospital Society in London. In time this would become the London School of Hygiene & Tropical Medicine, and it afforded Manson the opportunity to study the blood specimens of sailors from all over the world and to conclude that it was the mosquito that carried and transmitted malaria. Manson's discovery was undoubtedly one of the most important breakthroughs in the history of tropical medicine.

But many in the medical and scientific establishments remained sceptical. And London-based Manson was unable to get hold of the malaria-carrying mosquitoes to enable him to clinch the argument. That element of the puzzle was to be provided by another physician with strong Scottish connections – Surgeon Major Ronald Ross of the Indian Medical Service.

Ross, though born in the foothills of the Himalayas and educated in England, was the son of the celebrated Scottish soldier, Sir Campbell Claye Grant Ross. After graduating in medicine he returned to India in 1881 and spent the next two decades studying malaria. Drawing on Patrick Manson's hypothesis, he was able to accurately demonstrate the entire life cycle of the malarial parasite, including its presence in the mosquito's salivary glands.

It was a seismic moment for science and won him the Nobel Prize for Medicine in 1902. But Ross did not rest on his laurels. He argued for, and carried out, an aggressive programme of disease prevention in many parts of the world, including West Africa, the Suez Canal, Greece, Cyprus and in India. Malaria was always personal for Ronald Ross. Both he and his father had been struck down by the illness and it provided inspiration for some of the early poetry that this most versatile of academics produced.

*In this, O Nature, yield I pray to me.
 I pace and pace, and think and think, and take*

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*The fever'd hands, and note down all I see,
That some dim distant light may haply break.
The painful faces ask, can we not cure?
We answer, No, not yet; we seek the laws.
O God, reveal thro' all this thing obscure
The unseen, small, but million-murdering cause.*

Ronald Ross was feted by learned societies in a host of European countries and in 1909 he was invited to follow Patrick Manson as President of the Royal Society for Tropical Medicine and Hygiene. A post he held for two years. Like so many Scots who were influential beyond compare overseas, the name Ronald Ross is almost unknown at home. But his memory is cherished in India.

While Manson and Ross were unravelling the mysteries of malaria a third Scottish physician was making equally important discoveries in other branches of tropical medicine. David Bruce was, like Ronald Ross, an army doctor. And, again like Ross he was fascinated not just by treating illness, but by uncovering the root causes of disease. Bruce was perturbed when, on his arrival in Malta in 1884, he found the hospitals full of people suffering from a mysterious ailment known locally as Malta Fever. Though it bore many of the hallmarks of typhoid and malaria, it could not be diagnosed as either. Bruce got to work and within two years he had identified the bacteria which led to the fever (and which was consequently called Brucella) and eventually isolated the source of the infection to goat's milk.

Bruce did not stay long on Malta. The former governor of the island, Sir Walter Hely Hutchison, requested that the doctor be posted to join him in Natal in Southern Africa. There Bruce was faced with another challenge, but one which affected animals rather than humans. The veterinary disease nagana was ravaging the cattle herds on which the native peoples depended. Bruce was able to prove where the disease originated and, crucially, that the vector which transmitted nagana was the tsetse fly.

His work was interrupted by the Boer War and as a reminder that he was an army doctor first and foremost, Bruce found himself involved in active service, including being trapped during the siege of Ladysmith. When peace was restored, Bruce resumed his research, and in 1903 was posted to Uganda. Trypanosomiasis, or sleeping sickness, is endemic in many parts of East Africa. Today it affects around 70,000 people in the region. But at that time Uganda was in the grip of a devastating epidemic. Using the techniques he had developed in his study of nagana, Bruce was able to prove that both it and sleeping sickness were transmitted by the tsetse fly. It was another amazing discovery and one which allowed for the development of the first genuinely effective treatments.

Patrick Manson, Ronald Ross and David Bruce were giants of their age. But in their footsteps others, with equally significant contributions to make to our understanding of tropical disease, have followed. Amongst these are epidemiologist Alexander John Haddow who worked in Equatorial Africa from the 1940's to the 1960's, seeking out the causes and treatments for yellow fever and lymphatic cancer, and Sir Alexander Robertson, who gave his name to the centre for Tropical Veterinary Medicine which is now part of the world famous Royal (Dick) Vet School in Edinburgh.

And that conveyor belt of talent and expertise shows no signs of slowing down. The importance of the research that continues to be led from Scotland can be seen in the quality of academics that are attracted to the country and from the scientific breakthroughs that are achieved with astonishing regularity. Sir Paul Nurse, who won the Nobel Prize for Medicine in 2001, carried out post graduate research in the cell biology and genetics laboratory of the renowned Murdoch Mitchison. According to Nurse, the six years he spent in Edinburgh were pivotal to his entire career. The labs were exciting, stimulating places where innovation was encouraged and solutions demanded.

More recent projects have also drawn on this great tradition of marrying thought and action. Alison Blackwell and Sue Welburn, two entomologists from the Tropical Veterinary Centre, have developed novel ways of insect control to continue, in a modern fashion, Bruce's fight against sleeping sickness. And arguably an even more innovative approach in the battle to combat the spread of malaria has been adopted by researchers at Edinburgh University's School of Biological Sciences: Family planning for parasites! As Dr Sarah Reece, who led the study, explained: "We have long suspected that malaria parasites adjust their production of males and females to ensure their spread, and we have now shown that this is the case. We hope that by understanding the family planning strategy of these parasites, ways can be found to stop the spread of malaria."

The impact of Scottish scientists in the battle against tropical disease can hardly be overstated. But a wee beastie which could lay claim to being the scourge of Scotland has also, quite literally, come under their microscope. Millions of midges are being collected by Dr Blackwell and her team in an attempt to understand the bluetongue virus and to develop a contingency plan for any major outbreak in cattle. It is a reminder that

humble creatures like the midge in Scotland, or the tsetse fly in Africa, have the capacity for carnage. And a reminder too of the importance of the work carried on in Scotland and by Scottish scientists in the fight to combat tropical disease. Most recently this has been recognised by the award of a CBE to Professor Mike Ferguson at Dundee, a world renowned specialist in the biochemistry of tropical diseases who was given the award in the 2008 New Year's Honours List for services to science. His Unit was set up with £15 million of funding in partnership with The Wellcome Trust and with help from The Wolfson Foundation, The Scottish Funding Council and others, principally to deliver new medicines for African sleeping sickness.

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