

THE BEAST IN THE MOSQUITO: THE CORRESPONDENCE OF RONALD ROSS AND PATRICK MANSON

W.F. Bynum, C. Overy (eds), *Clio Medica* Vol 51 The Wellcome Institute Series in the History of Medicine, 1998 pp. 528

*T.M.S. Reid**

As an academic reference text, this carefully researched and annotated collection of the Manson-Ross letters provides an incomparable dispassionate database for the modern scientific historian. This is not a particularly user-friendly text for the average reader unfamiliar with medical and scientific terminology; the editors are however to be commended for including a glossary without which many will struggle to fully comprehend the data. Close reading of the letters will provide the inquisitive reader with a surfeit of meticulous, practical, scientific detail, as well as affording endless opportunity for observation and speculation on the nature of human relationships between mentor and disciple, latterly scientific equals and finally uneasy bedfellows.

It is particularly interesting to admire the qualities of Manson, a superb mentor whose ability to provide sage advice, quiet reassurance and, above all, to enthuse and encourage his protégé at vital moments, contributed in no small way to the ultimate success of the venture. Undoubtedly, many of Manson's qualities were acquired during his Scottish upbringing and education both at school and latterly at Aberdeen University. We can recognise in Manson many of the characteristic hallmarks of a native of the north-east of Scotland. He was clearly imbued with an endearing, quiet, unassuming character and intense humility adopting a non-confrontational approach in all matters. A man of few wasted words, his motto, which he repeatedly counselled Ross to remember, 'Nothing walks with aimless feet', befits his origins as does his mastery of understatement – when Ross triumphantly announced the successful conclusion to his work solving the malaria riddle, Manson said 'My only claim is that in a measure I discovered you'. Similarly he played down the inestimable value of their correspondence as a verbatim blow-by-blow record of scientific reasoning, the evolution and testing of a scientific hypothesis, Manson's 'Grand Induction'; and finally, despite many trials and tribulations, the achievement of the ultimate goal – commenting,

...the correspondence will have an interest and value in years to come to some medical Dryasdust writing the history of malaria when we are dead and gone – the bugs hunting us and not we the bugs.

His innate and acquired characteristics coupled with an acquisitive and retentive memory were honed by the many years of experience gained in the pursuit of his own Holy Grail – the establishment of the role of the filarial larvae in elephantiasis and the role of the mosquito in transmission of filariasis. Like so many Scots of his time, he was fired

with a missionary zeal to carry his knowledge to far-flung parts of the globe; in his case Formosa, Amoy and latterly Hong Kong. This was in truth the gestational period of the new and distinctive science of Tropical Medicine. This medico-scientific evangelism gained full expression when he became a Founder and First Dean of the medical school in Hong Kong and later played a leading role in the foundation of the London and Liverpool Schools of Tropical Medicine.

Ross, by contrast, appears to have been a reluctant doctor who 'had no predilection at all for medicine'; perhaps this meant clinical practice. His first love was mathematics but he had a particular yearning for literature and the Arts. Indeed he, if no-one else, highly valued his poems and novels which he published in later years. For one so inclined it is perhaps somewhat ironic that he appeared to thrive on confrontation and, in later years, when his scientific self-esteem had grown, he became intolerant of those who chose to disagree with him. Perhaps this was in some way explicable and understandable after years of being obstructed and trampled on by the elephantine bureaucracy of the Indian Medical Service, but it seems unfortunate and regrettable that blinded by an obsession with his place in the history of tropical medicine and malariology in particular, he allowed his spleen to poison even his special relationship with Manson as the later correspondence reveals.

Manson had followed the early work on malaria with a critical interest and, after much thought, had come to the conclusion, by analogy with microfilariasis, that the mosquito must play a vital role in transmission of the disease. He had published his working hypothesis in the *British Medical Journal* in 1894 in the hope that someone might be inspired to accept the challenge to prove or disprove the theory. It was clearly a remarkable document as Ross later remarked:

Manson's theory was what I have called it an induction – a chain of reasoning from which it was impossible to escape. ...I have no hesitation in saying that it was Manson's theory and no other which actually solved the problem.

Prior to his meeting with Manson in April 1894, Ross, although he had published papers on malaria in the *Indian Medical Gazette*, had searched in vain for the malaria parasite (first identified in 1880 by the Frenchman Laveran). Indeed he was barking up the wrong tree believing it to be an intestinal infection treatable with calomel. The defining moment in malaria research occurred when Ross visited Manson at his home in Queen Anne Street, London, and was shown blood films with crescents. This convinced Ross who, armed with Manson's reasoned 'Grand Induction' set out to prove the hypothesis that mosquitoes carry malaria just as they carry filaria. Crucial to this hypothesis was the contention that the malaria parasite, like *Filaria bancrofti* which Manson had studied extensively, could survive and develop outwith the human body and, in particular, in the

*Consultant Microbiologist, Aberdeen Royal Infirmary

tissues of the mosquito. As Manson opined,

The malaria germ does not go into the mosquito for nothing, for fun or for the confusion of the pathologist. It has no notion of a practical joke. It is there for a purpose and that purpose depends upon its own interests – germs are selfish brutes.

Two structures in particular, the crescents and the flagellae, were perceived to play a major role in this process; the latter featuring prominently in Manson's letters of advice with the repeated exhortation to 'Follow the flagellum'.

As with all ground-breaking research, the letters describe in vivid detail the many false trails and blind alleys which littered the path to the eventual verification of the hypothesis. Some were the result of genuine misconceptions – that mosquito-infected drinking water could transmit the disease. Equally, when you have no knowledge or understanding of the sexual nature of the reproductive process in plasmodia it is indeed puzzling to find that only 30% of parasites produce crescents.

As the correspondence develops, one can clearly see Ross maturing and becoming his own man. Interestingly, it was he who first suggested, 'the belief is growing on me that the disease is communicated by the bite of the mosquito – what do you think? She always injects a small quantity of fluid with her bite'. Manson was sceptical but not dismissive of his protégé's suggestion, making useful observations on how he might put his theory to the test.

Just as Ross' research expertise and momentum began to grow, he became increasingly frustrated. The time he could dedicate to his malaria research was severely limited as he was seconded to deal with an outbreak of cholera in Bangalore. These constraints and the uncertainty of his situation drove him to lose his self-esteem, perceiving a conspiracy against him. He even contemplated abandoning his research and reviving his long-standing desire to pursue a literary career. The correspondence at this critical time reflects well on Manson using all his skills and native cunning as a counsellor to give support to the younger man, but at the same time discounting these fanciful ideas of the depressed mind and stressing the need for Ross to refocus on the goal which was within his grasp. Meanwhile Manson was as ever the unseen hand active behind the scenes endeavouring to use his influence to secure a dedicated malaria research position for Ross. Achieving this in the face of the Indian Medical Service bureaucracy was easier said than done.

Manson's persistent persuasion and cajoling bore fruit when unexpectedly Ross, while dissecting the stomach wall of a mosquito which had gorged on a malarious patient, identified within the stomach cells pigment indistinguishable from that of malaria parasites. The realisation that these were pathological cells and certainly not derived from the mosquito, triggered an excited wave of emotion dispelling any lingering dark clouds of self-doubt – 'wonder if I'm really on it at last'. This, the 20 August 1897 was, indeed, Ross' 'Mosquito Day'.

However, further frustration in the form of a frontier war and plague epidemic saw Ross posted to Kherwara where human malaria was uncommon. Consequently, he turned his attention to the analogous model of bird malaria. At long last, in late January 1898 with the end in sight, Ross was finally granted leave for malaria research. The final

vindication of Manson's 'Grand Induction' was rapidly obtained. With perceptible relief, satisfaction and pleasure he wrote in triumph:

My one wish is that you were here to share with me the pleasure which I have experienced yesterday and today in seeing your induction being verified step by step. Such pleasure comes to but few men I fancy though you must have felt it with regard to your filaria.

In addition, he documented the presence of the parasite in the salivary glands confirming his own theory of transmission. Telegrams to Manson arrived just in time for Manson's Presidential Address to the newly formed Section of Tropical Diseases of the British Medical Association which was meeting in Edinburgh at the end of July 1898. In his address entitled 'The mosquito and the malaria parasite' Manson was effusive in his praise for Ross.

As Ross' sponsor Manson was always at pains to ensure that due recognition and reward was accorded to the researcher working in the field and to this end he missed no opportunity to present and publish the findings of his protégé seeking no personal gain. It is worth remembering that Manson himself benefited from the support of Spencer Cobbold and his lifelong friend and counsellor Sir Alexander Ogston who were instrumental in publicising many of his original discoveries on filariasis.

On his return from India, Ross was, as Manson had predicted, 'lionised', culminating in the award of the Nobel prize for Medicine in 1902. In his Nobel Prize Lecture Ross paid fulsome tribute to Manson for his continuous support, advice and assistance throughout his researches – 'Pour éviter tout commentaire erroné qu'il me soit permis de déclarer ici que mes travaux ont été entièrement dirigés par Manson'.

The late correspondence included in the collection contains much less detailed scientific data but does give an insight into Ross' apparent disillusionment despite the many accolades he received. It rankled with him that, unlike Manson, he was never fully accepted as a member of the London medical establishment. Further, he became obsessed with his place in history and his *bête noire*, G.B. Grassi, the Italian who contested his claim to being the first to solve the malaria problem. There is a certain irony that the true value of Manson's early revolutionary discoveries on filariasis from which evolved the 'Grand Inductio' and the research strategy which finally solved the conundrum of the causation of malaria were somewhat eclipsed in later years by the sensational story of malaria and the mosquito. Ross' letters to Manson became less deferential; indeed, on occasion, frankly critical, threatening to sour their longstanding relationship. Perhaps it simply reflected intense rivalry between the London and Liverpool Schools but on the other hand the two men frequently spoke with one voice in furthering the discipline of Tropical Medicine and its important role in solving global problems. In later years Manson, in varying health, maintained his dignity refusing to be drawn into public controversy and open hostility. Sadly, Ross, in his crabbed old age, produced his memoirs in which he denigrated Manson and belittled his contribution in an inappropriate outpouring of vitriol which ill became such an eminent scientist.

One hundred years on, in a world obsessed with word processors and E-mail, the time-honoured discipline of

exchanging handwritten letters may well be in danger of becoming a lost art. The Manson-Ross letters are truly unique in the history of scientific endeavour providing as

they do a graphic account of the unravelling of one of the world's greatest enigmas – a remarkable testimony to the combined efforts of these two giants of Tropical Medicine.

SIGN Publications

SIGN publications available July 1999

- 4 Prevention of visual impairment in diabetes
- 5 Interface between hospital and the community: the immediate discharge document
- 6 Hospital inpatient management of acute asthma attacks
- 7 Helicobacter pylori: eradication therapy in dyspeptic disease
- 9 Management of diabetes in pregnancy
- 10 Report on good practice in the management of children and young people with diabetes
- 11 Management of diabetic renal disease
- 12 Management of diabetic foot disease
- 13 Management of patients with stroke part I: Assessment, investigation, immediate management and secondary prevention
- 14 Management of patients with stroke part II: Management of carotid stenosis and carotid endarterectomy
- 15 Management of elderly patients with fractured hip
- 16 Colorectal cancer
- 17 Investigation of asymptomatic microscopic haematuria in adults
- 18 Investigation of asymptomatic proteinuria in adults
- 19 Management of diabetic cardiovascular disease
- 20 Management of patients with stroke part III: Identification and management of dysphagia
- 21 Diagnosis and management of epilepsy in adults
- 22 Interventions in the management of behavioural and psychological aspects of dementia
- 23 Management of lung cancer
- 24 Management of patients with stroke part IV: Rehabilitation, prevention and management of complications, discharge planning
- 25 Report on a minimum data set for collection in people with diabetes
- 26 The care of patients with chronic leg ulcer
- 27 Drug therapy for peripheral vascular disease
- 28 Management of adult testicular germ cell tumours
- 29 Breast cancer in women
- 30 Psychosocial interventions in schizophrenia
- 31 Report on a recommended referral document
- 32 Coronary revascularisation in the management of stable angina pectoris
- 33 Primary care management of asthma
- 34 Management of acute sore throat and indications for tonsillectomy
- 35 Diagnosis and treatment of heart failure due to left ventricular systolic dysfunction
- 36 Antithrombotic therapy

Due to be published by August 1999

- 37 Hysteroscopic surgery
- 38 Emergency management of acute asthma
- 39 SIGN Guidelines - an introduction to SIGN Methodology for the development of evidence-based guidelines
- 40 Lipids and primary prevention of coronary heart disease
- 41 Secondary prevention of coronary heart disease following myocardial infarction

SIGN guidelines and reports are available free of charge within the NHS in Scotland. Elsewhere, a charge of £5.00 per copy for publications no. 1-24 and £7.50 per copy for publications no. 25 onwards applies. An additional charge is made for postage: 1-2 copies £1.00; 3-5 copies £3.00; 6-10 copies £5.00; 11-20 copies £6.00; 21-25 copies £7.00. For postage outside UK, please apply to the SIGN Secretariat for details.

To order publications please contact the SIGN Secretariat, Royal College of Physicians, 9 Queen Street, Edinburgh EH2 1JQ. (Tel 0131 225 7324).

Payment is required with order. Please make cheques payable to Royal College of Physicians of Edinburgh .

SIGN guidelines and reports can also be downloaded free of charge from the SIGN website:
www.show.scot.nhs.uk/sign/home.htm