

## JAMES CRAWFORD KENNEDY AND THE SEXUAL TRANSMISSION OF BRUCELLOSIS

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### Introduction

British army doctors have played a vital role in the research into the obscure fever noticed on Malta. From Marston in the mid-Victorian period through Bruce, Hughes and the members of the Mediterranean Fever Commission (MFC) to the present day with Colonels Vella and Vassallo, Brucellosis has been central to the Corps. Known as the 'Corps Disease' it is the equivalent of a battle honour. But the researches of one doctor have been forgotten – if indeed they were ever recognised. In 1905 Captain Kennedy RAMC of the MFC noticed that *'by far the larger proportion of those who developed Malta Fever [now Brucellosis] after admission to the military hospital were venereal cases'* [1]. He found twelve cases where the probability of infection being contracted in Hospital could be excluded.

### Shoe leather research

As the means of transmission of the disease was unknown, it was a curious observation and he visited Strait Street in Valletta, or the Gut as it was known to every British serviceman who served on Malta, to carry out his medico- social research. It was the good time home of bars and women, with a variety theatre in a side street at its northern end. Escorted by the Superintendent of Police, Kennedy visited the brothels – possibly the only occasion

in which the police have assisted in a microbiological investigation. He wrote that *'these places were as a rule in an indescribably filthy condition and one would think that it would be possible to contract any disease in existence by patronising these establishments.'* He collected many bugs, dust, filth and samples of water, but failed to find any signs of the bacteria.

The women were not Maltese and were medically examined three times a month under an Aliens Act. Later, he examined them and found that 41 of the 134 women were positive for Brucellosis by the blood agglutination test. He took urine samples and swabs from the vagina and cervical mucus for culture in the laboratory. He isolated colonies of *Micrococcus melitensis* [as it was then known], the bacteria which cause Brucellosis, from four of the urines and two of the vaginal swabs. He also isolated the bacteria from the vaginal swabs, milk and urine of a married woman one week after her discharge as a convalescent from the Military Families Hospital in Valletta.

### Experiments

Kennedy continued this work by transmitting the disease to two monkeys. He put an infected urine on cotton wool which he then wrapped around the glans of a monkey for half a minute; the monkey was infected. He repeated the experiment with another monkey by applying slight friction to the glans before applying the urine sample – he recovered 10,000 cocci/ml from a blood sample taken later. Kennedy reported *'this investigation therefore clearly demonstrates the possibility of infection by means of sexual congress, and the importance of ambulatory cases and of a prolonged bacteruria during convalescence.'*

Nearly 30% of the women were positive, although among Maltese in general there were 4 cases per 1,000 in that year [2], and likely that they acquired the infections from their clients. The early investigations had shown that male urine contained the bacteria and that careless voiding in the dockyard might be a source of transmission. Kennedy did not show that men could transmit the bacteria to women, nor did he apparently try to use his monkeys to show this. There is no record that anyone tried to show that male sperm contained the bacteria or that cases of transmission could be found among the Maltese. There is also the possibility that a billy goat could infect the nanny goats in his herd, a possibility which could have been tested.

### Other research

Captain Kennedy [1879-1944] graduated from Edinburgh Medical School in 1900 and joined the RAMC. He was posted to Malta at the Station Hospital in Valletta in 1902 and worked part-time for the MFC from its inception in June 1904 until appointed to it in early 1905 – while still with clinical responsibilities at the hospital. He continued until the end of the work in late 1906 although like Shaw and Zammit, he was ill in the December of 1905. In 1908, Kennedy's thesis of his Maltese research earned him not only an Edinburgh M.D., but also a Gold Medal [1]. His thesis contained interesting background material about the disease

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in Malta. For instance, he recorded that the goat-herder's hands transmitted the disease from one animal to the next because he wet his hands with the milk from one to lubricate the next. He also recorded that bites and injuries to the udder were common – the udder trailed along the ground. Goats' milk was supposedly sterilised in the service hospitals, but in practice, more raw milk was added and the mixture was used before it had been properly sterilised. However, Kennedy noted that ice cream, sold in the streets and popular with the servicemen, was of two kinds. The dearer which was probably eaten by officers, was a custard of milk and eggs, heated to 80-90°C and then frozen. The cheaper variety was frozen flavoured milk which might have added cream. This cheaper ice cream might well have been responsible for unexplained isolated cases of the fever. He also explained that the bacteria were retained in the curd used for making the cheese in the cheese cakes sold everywhere.

The papers by the Commission doctors were published in the *Mediterranean Fever Commission Reports (MFC)*, and were duplicated in the *JRAMC*. Kennedy reported that 'Hints have been dropped from more than one quarter that the Reports of the Mediterranean Fever Commission were too deeply scientific to appear as full reports in our journal' [3]. He continued 'It has therefore occurred to me that I could supply some little bits of humour which might, to some extent, counterbalance the depressing effect which these reprints appear to have had'. Kennedy was the only member of the Commission who would have been in daily contact with other junior RAMC officers who might have joked with him about this. Like other articles and Kennedy's thesis, the disease was called 'Malta Fever' even though the Commission was deliberately named 'Mediterranean Fever'.

As a member of the MFC Kennedy wrote a number of papers of his own work as well as joint work with Horrocks; his final paper was a long summary of the 1906 work with Eyre, McNaught and Zammit [4]. In 1904, Zammit in particular was fascinated by the work on mosquitoes by Ross and the Americans. He, Horrocks and Kennedy, spent much time and energy trying to show transmission by mosquitoes in spite of the fact that the fever continued to be transmitted in the winter when there were no insects. Kennedy's most important work among these papers would be that on urine [5,6].

Later, Kennedy wrote two more papers in the *JRAMC*. The first, when he was back in London, was about cases of poliomyelitis in British and other servicemen in Peking [7]. The next, continuing his work on Brucellosis was to report the presence of agglutinins specific for the bacterium of Malta Fever present in two thirds of sera, and three of 22 milk samples from cows in London. Dr. Zammit supplied him with a recently isolated strain of the bacterium from Malta and also sent samples of milk from an infected Maltese goat. This was 'the first clue to the relationship between Malta Fever and contagious abortion' [8].

## His later career

Kennedy was promoted Captain in 1903. From 1909 to 1913, he was Assistant Professor of Pathology at the RAMC College in London. He left to go to India where he introduced effective measures to stamp out an outbreak of beri-beri. He was at an enteric convalescent hospital 1914 to 1918 until transferred to Mesopotamia. In 1920 he returned to the RAMC College as Professor of Tropical Medicine. He was a specialist on behalf of the army for tuberculosis. From 1922 to 1929 he was Consultant Physician with the British army with a tour to Turkey in that first year. He returned to India as ADMS Poona in 1929 and retired in 1932 when he became Medical Inspector for the P & O line [9].

## A knowing monkey

An instructive and perhaps humorous incident was recited by Kennedy in his MD thesis [1]. 'One of the monkeys had become very

*knowing and learnt to shut his nostrils when the dust was being blown in by means of a rubber bag. One day the attendant (RAMC) instead of using the rubber squirt put his mouth to the tube intending to blow it in himself. Unfortunately for him, the monkey blew first! A fortnight to 3 weeks later he was sent to hospital with an attack of fever. Whether the infection was really contracted by him in this way cannot be absolutely decided, but he himself blames the dust.*

## Discussion

Captains Bruce, Hughes and Kennedy were all appointed to Malta as their first clinical experience in the army and all three were absorbed by the problem of 'Malta Fever'. Soon after his arrival in Malta, Kennedy wrote to Colonel Bruce in England from which followed a correspondence of twelve letters of encouragement, and Kennedy's appointment to the MFC [10]. Bruce suggested that Kennedy use monkeys to test how the bacteria left the body and how long they survived in the blood. He urged Kennedy to 'look at the wonderful work of the American Military Surgeons in Yellow Fever, and Ross' work on Malaria'. Two days later he wrote to both Zammit and Kennedy urging them to combine forces. It is interesting that the significant research by the Commission was done by the three young doctors, all of whom had other work and were only part-time. Textbooks about Brucellosis seem to have missed sexual transmission and the website of *Sexually Transmitted Diseases* does not include Brucellosis in its list of diseases. So far as I know, no-one examined how far this source of infection might have been responsible for cases in Malta, especially among British servicemen. Nearly a century later, a paper in the *Lancet* asked whether the disease could be sexually transmitted [11,12].

## Conclusion

Kennedy saw an interesting pattern of infection. His modest investigations, just like John Snow's in Soho, gave striking results, as did his later work with cows' milk in London. The small laboratory on the roof of the military hospital in Valletta where Bruce and Caruana Scicluna discovered the bacteria and where Kennedy worked is no more but is commemorated by a plaque on the side of what is now the Mediterranean Conference Centre. And if the Gut should be turned into an up-market tourist attraction as is planned then perhaps it would fitting if it was commemorated by another blue plaque registering its unique place in the history of epidemiology and the insight of a remarkable RAMC doctor.

Further information about Brucellosis may be found at <http://sites.google.com/site/vivianwyatt/>

## References

- 1) Kennedy JC. *Malta fever*. MD thesis, Edinburgh University 1909.
- 2) Anon. *Annual Report of the Public Health Department for 1905-1906*, Malta.
- 3) Kennedy JC. A little humour from the Malta Fever Commission. *J R Army Med Corps* 1907; **9**: 594-598.
- 4) Eyre JWH, McNaught JG, Kennedy JC, Zammit T. Report on the bacteriological and experimental investigations during the summer of 1906. *MFC* 1906 Part VI: 1-137.
- 5) Kennedy JC. On the recovery of *Micrococcus melitensis* from the urine of Mediterranean patients. *MFC* 1905 Part III: 56-70.
- 6) Kennedy JC. On the viability of *Micrococcus melitensis* in urine [in which has been excreted], on cloth, in dust, sterile tap water, and sterile milk. *MFC* 1905 Part III: 71-82.
- 6) Kennedy JC. Examination of goats' blood for reaction to Mediterranean Fever.
- 7) Kennedy JC. A report on two cases of acute anterior poliomyelitis that occurred in the British troops stationed at Peking. *J R Army Med Corps* 1913; **20**: 666-675.
- 8) Kennedy JC. Preliminary note on the presence of agglutinins for the *Micrococcus melitensis* in the milk and blood serum of cows in London. *J R Army Med Corps* 1914; **22**: 9-14.
- 9) Anon. Obituary. *The Times* 26 April 1944 p 8.
- 10) Letters from Bruce to Kennedy. Collection of Bruce papers etc in the RAMC archives at the Wellcome Institute for the History of Medicine, London.
- 11) Mantur BG, Mangalgi SS, Mulimani M. *Brucella melitensis* – a sexually transmitted agent? *Lancet* 1996; **347**: 1763.
- 12) Wyatt HV. *Brucella melitensis* can be transmitted sexually. *Lancet* 1996; **348**: 615.