

## THUCYDIDES AND THE PLAGUE: A FOOTNOTE

Since the publication of our article on Thucydides and the Plague of Athens,<sup>1</sup> Dr Heinrich von Staden of Yale University has kindly drawn our attention to a paper by Eby and Evjen<sup>2</sup> suggesting that the Plague was glanders. We do not think that this diagnosis can possibly be correct, though there are undoubtedly some points in its favour. The authors have argued their case as persuasively as possible, and the proposal has sufficient merit to deserve a serious reply.

There seem to be two good points in favour of the idea. *Pseudomonas mallei* has a very wide host range and can infect most warm-blooded animals (including birds), so that Thucydides' statement that (in addition to man) vultures, kites, jackals and dogs were affected by the Plague of Athens is compatible with a diagnosis of glanders. The second and rather less persuasive point is that the symptoms and signs of glanders in man so far as recorded are so very variable that one cannot positively state that there is anything in Thucydides' account of the clinical course of the disease that is inconsistent with the idea that the Plague was glanders.

However, there are some serious, and, we think, insuperable objections. These concern the case mortality, the mode of transmission and the specific acquired immunity.

First, all accounts agree that the case mortality in human glanders is extremely high, approaching 100 per cent in untreated cases. Had this been so for the Plague, the population of Attica would have been largely wiped out and the Peloponnesians would have been rapidly and completely victorious. In fact the Athenians were able to continue hostilities even when the Plague was at its worst, and when the war came to a temporary stop nine years later the result was a stalemate. Thucydides gives one useful piece of statistical information: it appears that 26 per cent of Hagnon's expeditionary force to Potidaea died from the Plague. The case mortality may have been a bit higher than this, as very likely not all the soldiers were infected. However, the force returned to Athens, depleted no doubt, but with a substantial proportion of survivors. The fact that Thucydides was able to observe acquired immunity to the Plague (see below) also implies that there were many survivors.

The second major objection concerns the mode of transmission. Glanders is primarily a disease of horses which occasionally infects man. Man-to-man transmission can undoubtedly occur, but we can find no evidence that this has ever happened on a large scale. Eby and Evjen (n. 7, p. 259) seem to have misunderstood a sentence in Hull's monograph on diseases transmitted from animals to man.<sup>3</sup> The passage actually reads: 'In 1918, following the conclusion of World War I, the incidence of human glanders in Russia is reported to have been for a time appallingly high, due to lack of control of the disease in horses.' In other words, because of the exceptionally large number of infected horses, there was a corresponding increase in horse-to-man transmission: it is not suggested that man-to-man transmission was responsible for any large proportion of the human cases. In fact glanders seems to have been a relatively uncommon disease in man even when it was common in horses. Some useful

<sup>1</sup> J. C. F. Poole and A. J. Holladay, 'Thucydides and the Plague of Athens', *CQ* n.s. 29 (1979), 282–300.

<sup>2</sup> C. H. Eby and H. D. Evjen, 'The Plague at Athens: A New Oar in Muddied Waters', *Journal of the History of Medicine and Allied Sciences* 17 (1962), 258–263.

<sup>3</sup> W. E. Jennings in: *Diseases Transmitted from Animals to Man*<sup>4</sup>, ed. T. G. Hull (Springfield, 1955), pp. 174 f.

information on this point is provided by M'Fadyean,<sup>4</sup> who described the position in Great Britain at the beginning of the century. It appears that over the preceding 5 years 'over 2,000 horses have been slaughtered annually on account of glanders'. And yet 'on an average glanders causes the death of about four persons annually (seventy-eight deaths during the twenty years 1883-1902)'. Most cases occurred in ostlers, grooms and coachmen. Knackers and horse-slaughterers might have been supposed to be particularly at risk, but the London firm of Harrison, Barber and Co. slaughtered 800-2,000 glandered horses annually between 1893 and 1904 without a single case of infection among the staff. Clearly, horse-to-man transmission was rare and man-to-man transmission must have been very rare indeed in the period studied by M'Fadyean. If these figures are extrapolated to the situation in Athens at the time of the Plague it would be necessary to suppose that the people of Attica were accompanied by about 50,000,000 infected horses!

Third, there is the question of immunity. With so very few people surviving a disease that in any case has probably never been common, it is not surprising that there is no information as to whether or not a human being who recovers from glanders has any acquired resistance to subsequent infection. It appears, however, that horses often recover but have little or no immunity and can contract the disease again on exposure to either natural or experimental infection. It is not likely that man would differ from the horse in this respect. Eby and Evjen concede that: 'The attainment of a supposed immunity from the disease after an initial recovery is more difficult to explain'. They suggest that Thucydides may have observed cases of chronic glanders and misinterpreted his observations. But this is not really a plausible explanation. Most cases of chronic glanders eventually die from the disease, although it may be protracted for months or years. But Thucydides stated unequivocally that those who recovered from the Plague did *not* subsequently die of it.<sup>5</sup> Thucydides himself survived for approximately three decades after his own attack. In any case (as we have argued in more detail in our article)<sup>6</sup> specific acquired immunity to a disease was unknown at the time. It is hard to believe that Thucydides could have described the phenomenon so clearly if it did not in fact occur.

In short, the suggestion that the Plague of Athens was glanders has a few things to be said in its favour but, for the reasons given above, must be regarded as wildly improbable.

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<sup>4</sup> J. M'Fadyean, 'The prophylaxis of glanders', *Journal of Comparative Pathology and Therapeutics* 18 (1905), 23-30.

<sup>5</sup> Thuc. 2. 51. 6.

<sup>6</sup> Op. cit. (n. 1), pp. 297 f.