I smell a rat!

IJ Gordon, E Sherwood Jones

'Mr. Speaker, I smell a rat; I see him forming in the air and darkening the sky; but I'll nip him in the bud.' Sir Boyle Roche 1743–1807 (Concise Oxford Dictionary of Quotations, 1981)
'...refined clinical evaluation may be equivalent or even superior to ancillary testing...' (Halkin et al, 1998).

INTRODUCTION

This is a case history with a difference. The year was 1938 and the story was told to one of us in 1946 by Henry Cohen (HC), then Professor of Medicine at Liverpool (*Figure 1*). Both diagnosis and successful treatment were made in the patient's home without any of the customary investigations. The case is reported because it still provides lessons: there are no substitutes for wide-ranging knowledge and its thorough clinical application.

RAT BITE FEVER, THEN AND NOW

A few observations on the diseases transmitted by rat bite are given in case the reader has not seen examples during the last few weeks or even years.

Rat bite fever has two causes: a spirochaete, *Spirullum minus*, or a Gram-negative rod, *Streptobacillus moniliformis*. *Spirullum minus* is identified by dark field microscopy or Giemsa staining of fluid from the wound, lymph node or skin papule. There were no serological tests in 1938 for *Spirullum minus* and the same applies 60 years on. *Streptobacillus* spp. is diagnosed by culture from the wound, blood or abscess or by demonstrating a rising titre of antibodies.

Those at risk are the homeless or laboratory personnel, and transmission of *Streptobacillus* spp. occurs in up to 10% of bites. The illness can be more serious than experienced by our huntsman because of involvement of the brain, heart, liver or kidney. Untreated, the mortality ranges from approximately 6 to 10%. As in HC's patient, the disease can be transmitted by other rodents and by pigs. On rare occasions, Weil's disease is transmitted following a rat bite rather than the usual source of the urine of rats, cattle, pigs, goats, dogs and marsupials (Alston and Brown, 1937). The first choice antimicrobial treatment for all three infections is penicillin.

Between January 1990 and August 1998 the Communicable Disease Surveillance Centre (UK) received four reports of rat bite fever caused by *Streptobacillus* spp, all of whom survived.

CASE REPORT

A man in early middle age was master of a pack of foxhounds in 1938. The Fitzwilliam hunt was established in Cambridgeshire and Northamptonshire in the 1740s and the patient lived in Milton, then in Huntingdonshire. The illness started rapidly with a rigor, myalgia and arthralgia. This was followed by a macular rash concentrated on the right arm. The fever peaked in 3 days when a crisis occurred. This was followed by a week's remission that was thought favourable until the relapse. These signs were accompanied by anorexia, weakness and weight loss. A deteriorating patient and failure of the local doctors to make a diagnosis caused sufficient alarm to seek another opinion. After all, without proper supervision of the hounds, there would be no hunting!

The successful consultation

The journey from Liverpool to Milton was slow by present standards but comfortable. HC travelled in a vintage Rolls Royce driven by his regular chauffeur. The history taking was leisurely and meticulous. The physical examination was thorough to the point of obsession; whatever the symptoms the central nervous system was examined in detail*. A crucial sign was observed, either missed or ignored by others. This was a healed wound on the right hand, inflamed and surrounded by a dense macular rash. Lymph nodes in the axilla were enlarged and tender. The problem was solved! To quote HC 'staking my diagnosis on a single question I asked the master of the hounds "When were you bitten by a rat?" The reply was slow in forthcoming because of toxaemia and weakness: "I have not been bitten by a rat, but recall that 3 weeks ago I was bitten by a ferret".' A few ferrets were kept to assist in rabbit shooting and although tame the animal had transmitted rat bite fever.

Treatment quickly followed diagnosis. HC gave the initial dose of neoarsphenamine† intravenously and the master of the hounds was on the way to a full recovery. HC concluded the story: 'My reputation and private practice in the area flourished'.

*How long does it take the reader to examine the twelve cranial nerves?
† An organic arsenical used to treat syphilis, anthrax, rat bite fever and relapsing fever

LESSONS IN DIAGNOSIS

Rat bite fever was no challenge to HC's encyclopaedic knowledge and its logical application (Cohen, 1943). The same was true of tuberose sclerosis or insulinoma. The case contains lessons for we lesser mortals. A careful history should include risk factors, social conditions, occupation and not forgetting 'unde venis' (where have you come from) — a

Dr IJ Gordon is Physician in Occupational Medicine, Whiston Hospital, Prescot, Merseyside and **Dr E Sherwood Jones** was Formerly Consultant Physician, Whiston and St Helens Hospitals, Merseyside

Correspondence to: Dr IJ Gordon, Archbishop's House, Church Road, Liverpool L25 5JF

Figure 1. Portrait of Henry Cohen in 1958. He was knighted in 1949 and made a peer in 1956.

jet traveller contracts malaria abroad and dies undiagnosed on returning home (Maegraith, 1963). Whether rare or common, all possible diagnoses should be suspected. Leptospirosis is common in tropical parts of Australia but the diagnosis can be missed unless suspected (Simpson et al, 1998).

HC would condemn the trend to replace rather than augment clinical skills with hi-tech diagnosis. This tendency must be rejected and the following warning heeded:

> **'the more complex high technology becomes, the more the basic skills are needed and the more difficult it will be to restore them once they are lost' (Goodwin, 1995).**

HM

Valuable assistance was given by Mrs C Clifford, Professor CHM Gilles, Sir Philip Naylor-Leyland Bt, Professor A Percival and Dr DM Wright. Figure 1 *is reproduced courtesy of the Liverpool Medical Institution.*

Alston JM, Brown HC (1937) The epidemiology of Weil's disease. *Proc Roy Soc Med* **30(1):** 741–56

Cohen H (1943) *The Nature, Method and Purpose of Diagnosis.* The Skinner Lecture. University Press, Cambridge

Concise Oxford Dictionary of Quotations (1981) *Concise Oxford Dictionary of Quotations.* 2nd edn. Oxford University Press, Oxford

Goodwin J (1995) The importance of clinical skills. *Br Med J* **310:** 1281–2

Halkin A, Reichman J, Scwaber M, Palitiel O, Brezis M (1998) Likelihood ratios: getting diagnostic testing into perspective. *Q J Med* **91:** 247–58

Maegraith B (1963) Unde venis. *Lancet* **i:** 401–4

Simpson FG, Green KA, Haug GJ, Brookes DL (1998) Leptospirosis associated with severe pulmonary haemorrhage in Far North Queensland. *Med J Aust* **169:** 151–3