

hospital staffing. All too often, however, reasonable proposals for reform are not put into practice, and the same may happen here. Consultants will feel threatened: some will lose junior staff and long term the quality of consultant work will change—and inevitably there will be a sharpening of the contrasts between teaching and non-teaching hospitals and between popular and shortage specialties. Junior staff will not like the restriction on their freedom of choice; and overseas doctors will complain that they are being singled out for special treatment.

All these groups must surely recognise that changes are overdue, and if they reject the proposals they have an obligation to suggest alternatives. If there is too much opposition, however, committees that should be taking unpopular decisions may not do so. Furthermore, the replacement of registrars by consultants will be expensive, and hard-pressed area health authorities will resist such changes unless the DHSS underwrites the costs. The report deserves wide debate: but if—as seems very possible—the Royal Commission takes a similar line then there will be no excuse for further procrastination.

¹ *British Medical Journal*, 1978, 2, 369.

² Maynard, A, and Walker, A, *Doctor Manpower 1975-2000: Alternative Forecasts and Their Resource Implications*. Report for the Royal Commission on the National Health Service, Research Paper No 4. London, HMSO, 1978.

³ DHSS, *Medical Manpower—the Next Twenty Years*. A discussion paper, 1978.

⁴ Institute of Manpower Studies, *The Determinants of Doctors' Career Decisions*. Published by the University of Sussex, 1979: copies are available at cost of photocopying from IMS, Mantell Building, Falmer, Brighton BN1 9RF.

Multiple-puncture tuberculin testing

Charles Mantoux, a French physician, introduced his intradermal tuberculin test in 1908—a test of sensitivity, like other tuberculin tests, not of resistance. The Mantoux test requires the intradermal injection of old tuberculin (OT) or purified protein derivative (PPD); the latter is generally preferred. Three dilutions are available, so that 0.1 ml of the test solution may contain one, 10, or 100 tuberculin units (TU). When compared with those of other tuberculin tests skin reactions to the Mantoux test are probably the most consistent and most reliably measured, and it is widely regarded as the definitive test; but some skill is required to perform the intradermal injection.

Many attempts have been made to find a simpler, reliable, single screening test of tuberculin sensitivity. Two multiple-puncture tuberculin tests are now used for this purpose. The test first described by Heaf in 1951¹ is most popular in Britain: a multiple-puncture apparatus delivers six vertical needle punctures through a film of tuberculin solution. The tine test uses a disposable stainless steel disc with four tines or prongs that have been dipped in old tuberculin, stabilised, and dried. Theoretically the Heaf test might transmit viral hepatitis, but, despite millions of tests, there is apparently no evidence that this has happened. A major disadvantage of the tine test is that each test costs 30p, whereas once the Heaf multiple-puncture apparatus has been purchased tests cost nothing—the tuberculin being supplied by the DHSS. These multiple-puncture techniques require care but little skill to perform. The main difficulties are the interpretation of the reactions (perhaps especially

in the tine test), the repeatability of the results, and their comparability with those of the Mantoux test.

Ideally we should have a single screening test of tuberculin sensitivity that is simple, reliable, easily read, repeatable, safe, and cheap. None has proved supreme in practice. The many comparisons of the Mantoux with the multiple-puncture techniques have given conflicting results. In 1959 a report of the Research Committee of the British Tuberculosis Association² concluded that, for epidemiological use, the Heaf multiple-puncture test would be preferable to the Mantoux 5 TU test because of its greater sensitivity; the Heaf test gave results intermediate between 5 TU and 100 TU Mantoux tests. In 1964 Emerson³ compared the Heaf and tine tests and found that more than 15% of tuberculin-positive reactors were tine-test negative. He concluded that all negative reactors to the tine test should have a Mantoux test. Papers from the United States in 1961,⁴ 1962,⁵ and 1963⁶ reported close comparability between Mantoux 5 and 10 TU and tine tests. In 1978 Lunn and Johnson,⁷ reporting for a subcommittee of the British Thoracic Association, concluded that “the tine test is unsuitable for epidemiological use because of the high proportion of negative and doubtful results in people positive on the Mantoux test.” At p 1325 Sinclair and Johnston reach completely opposite conclusions. These authors advocate application of the disc for two seconds. They also suggest that reactions of 2-4 mm should be considered as positive; the manufacturers' instructions treat such reactions as doubtful.

These contradictions urgently need to be resolved if the tine test is to become accepted. We need a comprehensive investigation to give definitive answers to the questions arising from these recent papers, and an approach has been made to the British Thoracic Association. The questions that need to be answered are these: Does the tine test give consistent and repeatable results? For how long should the tine disc be applied? Should tine test reactions of 2-4 mm induration be read as positive? When is the optimum time to read the tine test? How does the tine test compare with the Mantoux 10 TU test? And, finally, is the tine test of appropriate strength to make it as suitable as the Heaf test for general screening?

¹ Heaf, F, *Lancet*, 1951, 2, 151.

² British Tuberculosis Association, *Tubercle*, 1959, 40, 317.

³ Emerson, P A, and Shaw, E M, *Tubercle*, 1964, 45, 36.

⁴ Rosenthal, S R, *Journal of the American Medical Association*, 1961, 177, 452.

⁵ Capobres, D B, et al, *Journal of the American Medical Association*, 1962, 180, 1130.

⁶ Badger, T L, Breitwieser, E R, and Muench, H, *American Review of Respiratory Diseases*, 1963, 87, 338.

⁷ Lunn, J A, and Johnson, A J, *British Medical Journal*, 1978, 1, 1451.

The putrefied body

Of all the unpleasant tasks in medicine, the examination of a decomposed body must surely be the least attractive. Apart from a handful of hardened coroner's pathologists, their sense of smell atrophied by long abuse, doctors generally compete with each other to be elsewhere when a badly decayed corpse requires examination. This is unfortunate, because a considerable proportion of decomposed bodies have arisen from unnatural death and among these there is always the potential victim of criminal action. Thus the putrefied body requires at least the same degree of expert examination, notwithstanding the unpleasantness of the task. Recognising

this, the Association of Clinical Pathologists has devoted one of its well-known broadsheets to the subject,¹ commissioning Professor David Gee of Leeds to compress into a few pages a most useful résumé of what needs to be done by a pathologist, police surgeon, or indeed any doctor when the circumstances dictate.

Because of the decay, identity is of paramount importance. In fact, in those few cases where foul play has occurred there may well have been a deliberate intention to conceal the body long enough for putrefaction to make identification difficult or impossible.

Examination of the remains at the place of death is always preferable, as the experienced medical eye can often relate the condition of the body to its environment and come to a quick conclusion, such as the presence of a faulty heating appliance causing asphyxia or gas poisoning. If the scene cannot be visited, then the body should at least be seen with the clothes in place; this examination may well explain otherwise dubious marks on the skin of the neck, if constriction by collars has to be distinguished from blurred strangulation marks.

Where time of death is important—and it often is paramount in the minds of police officers, who have a touching faith in the accuracy of medical opinion—then the stage of insect infestation and the condition of vegetation under the body may be vital. The actual degree of decomposition is an uncertain guide to the interval since death. Errors of several hundred per cent can be made by the most experienced pathologist. Not only does the environment change in an unpredictable way, but two persons in exactly the same surroundings may show gross variation in the degree of putrefaction, even if they are lying side by side. Reduction of the body to virtually a skeleton may occur in as little as three weeks, given hot weather and abundant insect life. At the other extreme, mummification or the formation of adipocere may allow the deceased to be recognisable after a year or more.

Bodies recovered from water form the most common source of decomposed remains and provide some of the most difficult problems. With the maxim that "All bodies from water need not have drowned" firmly in mind, the pathologist may find that the problem of the cause of death may be insuperable. Determining this is difficult enough in a fresh corpse, but often the only honest answer in a putrefied cadaver is "unascertainable." Even here, valuable negative evidence may be found, if sought for diligently. The identity as well as the absence of injuries or of natural disease may be of considerable help to the police and coroner, if the temptation to do as little as possible with nostrils well averted can be resisted.

Even in the most unprepossessing material, surprisingly much information can be gleaned if the necropsy is conscientious. The organs are often in far better condition than the external appearances would suggest, and toxicological and even histological examinations may be of considerable value in cases which look hopeless candidates for any scientific investigation. Other ancillary methods may be pressed into service with advantage, such as radiology and dental identification. Drugs may persist in the fluids and tissues for long periods—a case was recently reported where high concentrations of barbiturates were recovered after seven years' burial. Where estimations of alcohol concentrations are important, caution must be used in interpreting the results, as micro-organisms can both produce and destroy ethanol in dead tissues. Multiple sampling sites should be used and if the results of the analyses vary widely then correspondingly less reliance should be placed on the results. For example, in the

Moorgate Tube disaster, samples taken from the driver several days after his death showed up to a fourfold discrepancy from different sampling sites.

In summary, this helpful broadsheet emphasises the need for an investigation which should be at least as thorough in the decomposed body as in the more tolerable subjects placed before a medical examiner. This is all the more important because statistically the putrefied cadaver is more likely to have been the result of unnatural causes.

¹ Association of Clinical Pathologists, *Broadsheet 91: Examination of a Decomposed Body*. London, British Medical Association, 1979.

Childhood urine infection in general practice

Interest in urinary tract infection waxes and wanes, partly as a reflection of its current rating as a cause of renal damage. In the 1960s urine infection was claimed to be the most important cause of renal damage and a preventable cause of renal failure. Now it is believed to be less important than glomerulonephritis, and there is some doubt whether current treatment can prevent renal damage. Nevertheless, there is agreement that urine infection causes much illness, unhappiness, and inconvenience, and that it is very common—particularly in childhood.

Screening studies have established that between 1% and 2% of girls at school have infected urine—"significant bacteriuria." Kunin¹ called this "asymptomatic bacteriuria," but the British workers who repeated his work drew attention to the fact that these children were not truly asymptomatic: they had minor symptoms including wetting and perineal discomfort,^{2,3} and were "asymptomatic" only in so far as these symptoms had not caused them to consult a doctor.

Though most children with bacteriuria have some symptoms, most children with dysuria and frequency do not have an identifiable urinary tract infection. The work by J A Dickinson (p 1330) shows this well. In his general practice he studied nearly 3000 children over an 18 months' period, with reference to urinary tract infection and urinary symptoms. Only 18% of the children who presented with dysuria had infected urine. A less careful doctor could well prescribe unnecessary antibiotics and arrange needless further investigation. The reported association of upper respiratory tract infection and urethral symptoms is well recognised by those familiar with children.

Dickinson found an incidence of urinary tract infection in symptomatic children of between one and four per 1000 children per year. The figure is lower than in some surveys, possibly because of different criteria for "symptoms" or because of stricter bacteriological criteria, which achieved an excellent degree of reliability (though requiring a rather cumbersome culture method). More convenient semiquantitative culture methods are now available, and it is sad that they are used so infrequently in general practice. Dip-slides (such as Oxoid or Till-U-Test) and pad culture (such as Microstix) are reliable and easy methods. Their great advantage is that they can be done by the doctor (or patient) as soon as urine is passed. Their convenience cuts out the considerable errors that result from delay in transporting and testing urine. A few bacteriological laboratories have made dip-slides available to general practitioners, but elsewhere there have been