penicillin-alone resistant strain was 2.5 mg/l (as opposed to up to 125 mg/l for multiply resistant strains). It would be interesting to know whether these findings apply to the usual community staphylococci of 1978, or indeed whether the resistance markers of hospital strains producing a lot of β -lactamase are still the same. If so can benzylpenicillin (or oral equivalent) be used with success for infections with low β -lactamase producing staphylococci in all sites, whether in or out of hospital? Until these questions are answered we prefer to continue advising cloxacillin (or flucloxacillin), when antibiotic therapy is required, for all infections with penicillin-resistant strains.

R E WARREN
E W WILLIAMS
S W B NEWSOM

Addenbrooke's Hospital,
Cambridge

¹ Price, D J E, *et al*, *British Medical Journal*, 1968, **3**, 407.

² Rolinson, G N, *et al*, *Lancet*, 1960, **2**, 564.

³ Richmond, M H, *et al*, *Lancet*, 1964, **1**, 293.

SIR,—Most consultants in accident departments throughout the country would agree with Dr Zehra A Hassam and others (19 August, p 536) that the majority of *Staphylococcus aureus* organisms grown from soft tissue infections presenting to their departments are now resistant to penicillin. They conclude their article with the statement that penicillin is still a suitable antibiotic, despite finding an in-vitro resistance of 86%. I find this hard to accept.

I can well recollect a very painful childhood because of recurring soft tissue infections but cannot remember ever having had a course of antibiotics. Is it possible, therefore, that the more correct treatment is that of a surgical approach and that the use of antibiotics is, in most cases, unnecessary? I would find it far easier to accept that 86% of their cases would have got better without any antibiotics, but nowhere in the article can I find reference to treatment other than antibiotics. A more logical conclusion to draw from these results is that there is still a continuing abuse of antibiotics within the community and that more effort should be made to eradicate this trend.

J K GOSNOLD

Accident and Emergency Department,
Hull Royal Infirmary,
Hull

Screening for breast cancer

SIR,—There are some things which we can afford to do under the NHS and others we cannot afford. It seems we cannot afford to give adequate cardiac surgery to patients in Liverpool or Birmingham or adequate orthopaedic services in Coventry or adequate general surgery in Northampton, for example. It is recognised that patients with carcinoma are having to go on a waiting list for surgery in several parts of the country.

But in Edinburgh about £100 000 can be spent on screening for breast cancer with detection of 18 cancers out of about 4000 women screened (15 July, p 175). Ten of these cancers were clinically detectable and therefore presumably could have been palpated by the women themselves.

There is no proof that early detection of

these cancers improves the survival rate. In a statement by the British Breast Group (15 July, p 178) it is stated: "We are convinced that early diagnosis of breast cancer is important and that it improves the survival rate." No evidence was presented for this dogmatic statement, nor is any available.

Screening for breast cancer is easily understood and therefore readily supported by politicians and journalists. It will become a marvellous bandwagon, symbolic of the excellence of the NHS. Already firms such as Marks and Spencer offer a free service to their female employees. Reports from the USA, Holland, and Sweden indicate that any modern industrial nation should be embarking on screening for breast cancer or be considered medically second class. The spending of money on grandiose but unproved projects such as breast screening is surely to be deplored when parts of the UK are medical slums.

A J FOGARTY

Donnington Health Centre,
Oxford

African travel

SIR,—Dr S G Barber's article on the care of trans-Saharan travellers (5 August, p 404) is interesting; it is good that the subject of expedition medicine gets aired. Most doctors assume that knowledge of this (highly specialised) field of medicine is acquired by osmosis rather than through hard work.

The article does, however, contain some statements with which not everyone would agree. Obviously each of us is biased and our field of vision is limited and coloured by experiences in our local duckpond. Mine stems from over 15 years of looking after the medical needs of expeditions and travellers of a senior Thameside university, coping with the returned failures, and for several years now for shorter and more extended periods looking after the health of thousands of young people in arid parts of the Sudan and neighbouring Ethiopia.

Dr Barber's section on prophylactic care is a little cavalier. Immunisations should never be given unless the questions "Where are you going?" and "What are you doing there?" have been asked. It is irrelevant that there is a lot of rabies in Ethiopia if the traveller is going to a conference in the Addis Hilton only, but highly relevant if the patient is a zoologist and is proposing to study the dentition of Ethiopian village dogs. You vaccinate the traveller to the Horn of Africa against smallpox not merely to protect him against immigration authorities but (still) against smallpox. Yellow fever can be a very unpleasant disease. Typhus may not be a problem in the Western Sahara, but in some parts of the Sudan and Ethiopia it is a common and nasty disease. Vaccination of travellers against polio is not just "well worth while," it is mandatory; paralytic polio is irreversible. Cholera vaccine, alas, at best protects the traveller against officious immigration officials, probably never against cholera.

For malaria prophylaxis proguanil is certainly not the drug of choice for most parts of Africa, where proguanil resistance is common. Unless there is informed local evidence to the contrary chloroquine two tablets a week (or twice a week in areas with lots of mosquitoes) is currently the only

reasonably reliable, easily available prophylactic. It is not beyond the wit even of the average intelligent person to swallow pills every Sunday. It should be spelt out that the pills should be started a week before and continued for six weeks after a visit to an infected area. Anyone who has had to cope (and with inadequate resources) with hundreds of young sick at once from malaria because of wrong or absent prophylaxis will surely agree.

It surprises me that the author does not mention the canvas water bag. One or several on the camel, Land Rover, or lorry will keep water for folk, beasts, and engines cool by slow evaporation through the canvas. Chlorine tablets can be added with success, and individual expedition members would surely carry their own $\frac{1}{2}$ -1-litre bottles (of metal, not plastic, which fractures when dropped), to which chlorine tablets can be added. If you are thirsty a little chlorine matters naught. (Perhaps long exposure to grossly chlorinated tap water is yet another advantage of an Oxford education.)

The importance of an adequate food intake, particularly of protein, has not been sufficiently emphasised. Morale and energy get low if the diet is inadequate. Vitamin supplements are essential. Hundreds of young unable to see after dark because of lack of fat-soluble vitamins can be an alarming experience. Professional desert travellers have repeatedly emphasised to me the importance of an adequate diet.

BENT JUEL-JENSEN

Radcliffe Infirmary,
Oxford

Selenium and motor neurone disease

SIR,—Your leading article on lead and motor neurone disease (29 July, p 308) suggests lead as the clue with the greatest aetiological potential in this disorder. But an alternative may be provided by selenium (Se). Se appears to be an essential trace element in animals and possibly in humans, it forms the active site of the enzyme glutathione reductase,¹ and it seems to inhibit lipid peroxidation in a similar manner to vitamin E.

Recently, high Se levels have been linked with amyotrophic lateral sclerosis when a clustering of four cases was reported from a high-Se area of South Dakota.² The same investigators have found an additional cluster of the disease in the same region.³ In the same area of South Dakota naturally occurring Se intoxication is endemic in farm animals and may appear in cattle as "blind staggers." In the above case reports plasma and cerebrospinal fluid Se levels were not measured in all patients, nor were controls used.

Improvements in the current fluorimetric methods of determination of Se⁴ may be required before Se reaches the stage of a "testable working hypothesis" in the aetiology of motor neurone disease.

While controversy continues regarding the role of Se in motor neurone disease,^{6,7} it is interesting to note that selenium sulphide in 2.5% solution is currently marketed as an anti-dandruff shampoo. There are no legal restrictions on sale of SeS₂ shampoo, thereby making it freely available from chemists. Although selenium sulphide is regarded as extremely insoluble and does not penetrate unbroken skin, ingestion does cause profound toxicity.⁸

At present there is no published evidence demonstrating higher plasma or cerebrospinal fluid Se levels in those using a SeS₂ shampoo. However, future investigations attempting to assess the role of Se in motor neurone disease will need to take into account this iatrogenic source.

T K DANESHMEND

Department of Pathology,
Bristol Royal Infirmary,
Bristol

¹ Schwartz, K, *Medical Clinics of North America*, 1976, **60**, 745.

² Kilness, A W, and Hochberg, F H, *Journal of the American Medical Association*, 1977, **237**, 2843.

³ Kilness, A W, personal communication.

⁴ Griffiths, N M, and Thomson, C D, *New Zealand Medical Journal*, 1974, **80**, 199.

⁵ Watkinson, J H, *Analytical Chemistry*, 1966, **38**, 92.

⁶ Schwartz, K, *Journal of the American Medical Association*, 1977, **238**, 2365.

⁷ Kurland, L T, *Journal of the American Medical Association*, 1977, **238**, 2305.

⁸ Association of the British Pharmaceutical Industry, *Data Sheet Compendium*, pp 26 and 1096. London, ABPI, 1978.

Cost of carrying out clinical diagnostic tests

SIR,—The cost of the NHS will always tend to outstrip the funds available and it is proper to look for ways in which money can be saved or redistributed within the service to better effect. Capital costs (buildings, plant, and equipment) and staff wages and salaries swallow up a major part of the available funds and—at least at the local level—it is by manipulation of the small but flexible “revenue” moneys that distribution anomalies can be rectified and new developments fostered.

It is against this background that we take issue with Mr D J Barnard and his colleagues (3 June, p 1463). They gave an itemised breakdown of the cost of carrying out a variety of diagnostic tests in their laboratory with particular reference to a number of radioimmunoassay (RIA) tests. Because the cost of labour, maintenance, and capital depreciation is large compared with the cost of reagents in the price of a single test they conclude that the use of expensive commercial RIA “kits” rather than inexpensive “in-house” reagents is justified. They claim that the labour cost reduction more than compensates an increased reagent cost and quote a specific case (serum B₁₂ and folate) as proof.

Maybe so, but from their own figures the 23% of their total tests which were carried out using commercial kits cost them £1386, while the 77% for which they used “in-house” methods cost only £416. Had they used commercial kits throughout the reagent costs would presumably have been close to £6000—an increase of more than £4000 in revenue expenditure. If this increased expenditure produces the labour-saving effect that they claim, then they will have saved the cost—and time—of at least one whole technician—a remarkable achievement.

Unfortunately the real implication of all this is that in money terms their whole RIA operation is inefficient. Their high cost-per-test is a consequence of the small number of tests done: as the load of tests increases the labour and fixed costs-per-test decrease. A comparison with this laboratory will demonstrate this. During the same period a little over 40 000 tests were carried out. Four technicians and one principal biochemist were involved. Although not all of their time was spent on RIA tests, for the sake of simplicity full time

is assumed (this results in an overestimate of time and costs). The tests carried out were thyroid-stimulating hormone, total thyroxine, total triiodothyronine, thyroid hormone binding index, growth hormone, follicle stimulating hormone, luteinising hormone, and prolactin. The average time for one test was 14 min and the average cost of time 57.5p. The average time and cost of time to Mr Barnard and his colleagues (from their data) were 27 min and 122p. Because our laboratory area (71.25 m²) is almost identical with theirs we may assume the same yearly discounted replacement and building maintenance costs. Our Nucleonic and other equipment (an automated system) is more expensive (£30 000). Discounting over seven years (an accountancy fiction: in the NHS equipment is used until it falls to pieces) gives £4286 per annum and maintenance (7% per annum) £2100. Our cost of collection and distribution (£2500) is rather more than four times theirs. Our total cost for radio-pharmaceuticals, reagents, and consumables, rounded up, is £5000. Adding administration costs at 3.3% to our total running costs of £39 000 (£1287) gives an average total cost per sample of nearly 101p. The average total cost per sample (radioimmunoassay) to Mr Barnard and his colleagues was 318p.

Hence it is uneconomical for laboratories to carry out small numbers of those tests, which are better handled in large numbers centrally by semi-automatic processing. These comparisons underline the fact that for every laboratory to provide a full service of available tests is very expensive. Radioimmunoassay test results in particular are rarely needed urgently and there is a strong case for handling the service load in specialised units of an appropriate size.

Specialised units are in a far better position to develop and maintain their own reagents and radiopharmaceuticals. This is important because commercial kits—if used—are the one item in the cost-per-sample which does not decrease as the scale of operation increases (apart from the marginal effects of discounts for quantity). Our reagents bill would increase by more than £25 000 per annum if we were to use commercial kits and there would be no saving in labour costs. This amounts to a very substantial saving in revenue costs which can then be deployed elsewhere.

The two conflicting views—that all laboratories providing a general service should “do everything” or that certain functions are best centralised—pose a problem which those who make the policy decisions must solve. But it is clear, in the case of radioimmunoassay at least, that small numbers of samples assayed in many laboratories are much more expensive than large numbers processed in centralised laboratories. If small operators also use commercial kits (and the temptation to do so is strong) the cost to revenue funds is needlessly high.

C CHAPMAN
CLIVE HAYTER

Department of Nuclear Medicine,
General Infirmary, Leeds

The continent urostomy

SIR,—I should like to support the balanced view given in your leading article (19 August, p 520) on the various techniques for appliance-free urinary diversion. Whether an ileocaecal segment or ileal pouch is used, catheterisation

of the urinary reservoir often becomes increasingly difficult and may require later conversion to a free draining conduit. Our experience over the last five years is with an ileocaecal segment,¹ which is ready made, but the ileal pouch may be preferable and worth constructing to avoid mucus problems and bowel spasm with distension.²

The criticism of all these techniques is the absence of a sphincter. Following the encouraging reports of the Heitz Boyer-Hovelacque procedure for exstrophy of the bladder in children,³ we have had an early encouraging experience in adults with a continent urinary diversion based on similar principles. The ileocaecal segment is isolated and the ureters anastomosed to the tail of the terminal ileum. A separate isolated length of ileum is then anastomosed to the caecal urinary reservoir and sleeved submucosally for about 10 cm through the anterior wall of the intact rectum and anal canal, to open on the perineum within the anal sphincters. It is too early to say whether problems with metabolic absorption will arise, but this continent diversion within the natural sphincter seems preferable in principle to intermittent catheterisation of a urinary reservoir. We hope to develop this technique, while agreeing that urinary continence must not be achieved to the long-term detriment of renal function.

M HANDLEY ASHKEN

Urological Unit,
Norfolk and Norwich Hospital,
Norwich

¹ Ashken, M H, *Journal of the Royal Society of Medicine*, 1978, **71**, 357.

² Madigan, M R, *Journal of the Royal Society of Medicine*, 1978, **71**, 542.

³ Taccioli, M, Laurenti, C, and Racheli, T, *British Journal of Urology*, 1977, **49**, 385.

Legionnaires' disease and acute renal failure

SIR,—The occurrence of acute renal failure or transient impairment of renal failure in legionnaires' disease (Professor D N S Kerr and others, 19 August, p 538) would not come as a surprise to anyone familiar with the work of the late James Reilly on autonomic irritation¹ and still less to anyone who had read his monograph on the role of the autonomic nervous system in renal disease, published in Paris unfortunately in 1942, which summarises the result of six years' work on over 1000 animals.²

Among other findings, Reilly showed that the toxins of bacteria, both Gram-negative and Gram-positive, constantly produced albuminuria and haematuria in experimental animals when placed in contact with sympathetic nerves, such as the splanchnic, or if injected intravenously.² The microscopic changes, congestion, haemorrhages, exudation, and sometimes thrombosis of glomeruli were identical with those seen in a series of 80 human subjects dying in a large fever hospital from overwhelming bacterial infections of all kinds.³

Such changes are seen less often since the elimination of the common infectious illnesses with antibiotic therapy. Gram-negative infections are an exception, and Reilly showed quite decisively that damage can occur with over-enthusiastic antibiotic therapy (“frappe fort”) releasing overwhelming amounts of endotoxin. Post-mortem findings in human subjects as well as experimental