better to an intravenous regimen. We can only record, anecdotally, that he showed a complete recovery without neurological deficit.

We have not obtained significant blood pressure reduction over two hours in severe hypertension with 80 mg propranolol or 100 mg atenolol by mouth, and bradycardia may be troublesome with these drugs. Further details from Dr Good of the dose, drugs, rate of blood pressure fall, and cardiovascular effects of oral beta-blockade would provide valuable comparison with our data.

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Do people smoke for nicotine?

SIR,—Mr Robert Stepney (8 April, p 922) noted that as the average nicotine delivery of UK cigarettes declined the annual consumption of manufactured cigarettes per smoker increased greatly. This observation suggested that a smoker may compensate for reduced nicotine deliveries by altering the way individual cigarettes are smoked. Your correspondent was careful to point out that a possible alternative explanation is that the number of smokers giving up the habit may have been drawn more from light than from heavy smokers, but submitted that until this is shown to have occurred the association between reduced nicotine delivery and increased consumption will tend to support the nicotine-dependence view of smoking (but see also Professor C M Fletcher, 29 April, p 1143).

The purpose of this letter is to corroborate the point made by Mr Stepney, using Canadian data. These also indicate that the annual consumption of manufactured cigarettes per smoker has increased as nicotine deliveries have decreased. While survey data indicate that the percentage of cigarette smokers has decreased, lighter smokers are diminishing as a class.¹ However, for most age-sex groups the median number of "constant tar cigarettes" smoked has decreased.² These survey data may represent underestimates, but nevertheless since tar and nicotine deliveries are highly correlated they are consistent with the assumption that many smokers can adjust to a cigarette delivering less nicotine.

Relevant evidence is also available from British data, summarised in the table below, which indicates that both male and female smokers have been smoking more cigarettes but that relatively more female ex-smokers are drawn from the light-smoking class. This fact may explain some of the increase in amount smoked per smoker noted by Mr Stepney.

Distribution of estimated daily amounts smoked in percentages (rounded) by current manufactured cigarette smokers and by current ex-smokers at the time of stopping, Britain 1965, 1971, 1975^a

Consumption	1965		1971		1975	
	Smokers	Ex-smokers	Smokers	Ex-smokers	Smokers	Ex-smokers
<i>Men</i>						
<11 cigarettes	32	29	26	27	23	24
11-25 cigarettes	50	43	50	45	47	45
>25 cigarettes	18	28	24	29	30	30
<i>Women</i>						
<11 cigarettes	55	67	44	67	36	54
11-25 cigarettes	34*	23*	45	26	50	36
>25 cigarettes	10†	10†	9	8	13	9

^aPercentage for 11-20 cigarettes; †percentage for 21+ cigarettes.

Lastly, it may be noted from studies on individual smokers that there are indications that the majority of smokers can adjust to a cigarette delivering less nicotine.³ That is, while many smokers changing to a cigarette delivering less nicotine tend to smoke so as to obtain more nicotine, it has been found that the total nicotine obtained, as estimated from their mouth-level exposure, is still generally considerably less than if they were to smoke their regular cigarette. Hence these and related observations suggest that it seems desirable to continue with the various measures, and also to consider additional measures, to make available cigarettes delivering less nicotine and tar.

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¹ Ouellet, B L, Romeder, J-M, and Lance, J-M, *Premature Mortality Attributable to Smoking and Hazardous Drinking in Canada*, vol 1, 14. Staff Paper, Long Range Health Planning, Health and Welfare, Canada, November 1977.

² Thompson, M E, *Statistics of Smoking in Canada*. Report submitted to Health and Welfare Canada, 1978.

³ Forbes, W F, *et al*, *International Journal of the Addictions*, 1976, 4, 933.

⁴ Lee, P N, *Statistics of Smoking in the United Kingdom*. Tobacco Research Council, Research Paper 1, 7th edn, tables 50W and 23W.

Lithium carbonate and tetracycline interaction

SIR,—Dr A J McGennis (6 May, p 1183) reports a case of lithium intoxication claimed to be a consequence of the nephrotoxic effect of tetracycline given concurrently. However, at least two other explanations of the intoxication reported seem just as reasonable.

It is a well-known fact that sodium plays a special role in the development and course of lithium intoxication. Recently Thomsen *et al*,¹ on the basis of clinical experience and experiments with rats, postulated the following mechanism. Administration of even non-toxic doses of lithium leads to an inhibition of the renal response to mineralocorticoids such as aldosterone. This causes a lithium-induced inhibition of distal sodium reabsorption, a condition that increases the minimum sodium requirement and may remain stable. However, change in sodium intake or in minimum sodium requirement from other causes may make this condition unstable. The minimum sodium requirement is determined by the serum lithium concentration. When this rises the sodium requirement increases. Sodium requirement is further increased as a result of extrarenal sodium loss like heavy sweating or diarrhoea. It is important to note that the "critical level" of serum lithium concentration, that at which sodium requirement exceeds

sodium intake, consequently does not have a fixed value. When the sodium intake is low (diet, intercurrent infections) it may fall below the minimum requirement and the critical serum lithium concentration is consequently low in these circumstances. This means that intoxication may occasionally develop at serum lithium concentrations within the therapeutic range in the absence of kidney disease. In the case reported sodium intake and loss are not mentioned. Therefore the possibility remains that the patient had a low critical serum lithium level owing to low sodium intake. The reported serum lithium levels of 0.5-0.86 mmol/l (0.35-0.5 mg/100 ml) may support such a hypothesis if these levels reflect changes in serum lithium concentration on a constant dose, thus indicating an unstable condition.

Another and probably more reasonable explanation is the concurrent use of tetracycline. In clinical practice diarrhoea is a more common side effect of orally given tetracycline than the nephrotoxic effect. It is therefore possible that the tetracycline caused diarrhoea with concomitant increased sodium loss and that this increased the sodium requirement above the critical level and lithium intoxication developed as a consequence. Also a combination of the two mechanisms described here may have been at work.

The present discussion emphasises that lithium therapy needs close supervision of the serum concentration even when the dose remains constant.

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¹ Thomsen, K, *et al*, in *Current Developments in Psychopharmacology*, ed L Valzelli and W B Essman, vol 3, p 156. New York, Spectrum, 1976.

Hygiene of operating theatre cleaning equipment

SIR,—We wish to draw attention to the importance of mops and buckets used for theatre cleaning as a possible source of infection to patients. Not much has been written on this subject, but Thomas and Maurer¹ showed the importance of hygienic mop maintenance in operating theatres.

We investigated the problem in the operating theatres of a busy general hospital. In the theatres synthetic sponge mops were stored overnight in buckets containing a 1% phenolic solution. The same mop and bucket were used to clean the sluice and the theatre suite. Samples taken from bucket fluids were heavily contaminated by *Pseudomonas aeruginosa*. The heaviest contamination was found in the autoclave room bucket fluid, where an in-use test, using the Kelsey and Maurer² method, showed *Ps aeruginosa* at a concentration of >10⁶ organisms/ml.

Our domestic manager was at that time evaluating a new range of mops with autoclavable sponge heads and colour-matched buckets, which he suggested might effectively replace the old system. The idea was taken further by using colour-coded sets whose use was confined to specific areas within the theatre suites.³ Bacteriological monitoring of the new equipment showed a great improvement. No *Ps aeruginosa* was isolated from the mops and buckets provided both were stored dry and the mops upended. However, if the mops were stored in the 1% phenolic solution overnight or were stored downwards in the bucket there

was heavy contamination by *Ps aeruginosa*. Likewise, if the buckets were left moist *Ps aeruginosa* was frequently isolated. The easily detachable mopheads and the buckets can be disinfected in the subatmospheric steam autoclave.

Other equipment used for cleaning in the theatre—for example, vacuum suction hoses and the tanks and brushes of scrubbing machines—also showed heavy contamination by *Ps aeruginosa* if not kept clean and dry between use. Damp floor cloths were contaminated with *Ps aeruginosa*, but with our new mop system these are no longer used. The periodic disinfection of vacuum suction hoses and the brushes of scrubbing machines in the subatmospheric steam autoclave is recommended.

Following the introduction of the new cleaning equipment our monthly wound infection records for *Ps aeruginosa* appeared to show a downward trend. We feel that the hygiene of theatre cleaning equipment is of great importance. Often the cleaning of theatres is left to operating theatre staff with no domestic training or supervision and without an awareness of the infection hazards of neglected equipment.

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¹ Thomas, M E M, and Maurer, I M, *Journal of Hygiene*, 1972, 70, 63.

² Maurer, I M, *Hospital Hygiene*. London, Arnold, 1974.

³ Foord, L, *Cleaning Maintenance Journal*, June 1978, p 25.

Comparison of the tine and Mantoux tuberculin tests

SIR,—I read with interest the report by Drs J A Lunn and A J Johnson on behalf of the Tuberculin Subcommittee of the Research Committee of the British Thoracic Association (3 June, p 1451) but, like Dr Maxwell Caplin and others (1 July, p 54) from the London Chest Hospital and associated clinics, I found the results completely at variance with my own.

I used the Mantoux test exclusively for many years but changed to the tine in 1970. Since then I have carried out, checked, and supervised about 200 tests each year as part of a hospital health care programme on a limited budget covering mainly nursing personnel but particularly student nurses, pupil nurses, and nursing auxiliaries as the most stable element. Many of these gave a history and/or evidence of previous BCG immunisation in Britain.

I have always considered that the revised criteria laid down by the British Thoracic Association for tine assessments were too stringent. Based on the original recommendations of the manufacturers, Lederle Laboratories Division, I evolved my own system, checking the negatives by the absence of accelerated reactions to subsequent

BCG immunisation. In my practice I regard a reaction of 2 mm+ as positive, 1-2 mm persisting as mild positive, and the remainder negative. I have searched through my records and eliminated a number of cases in which, for one reason or another, records were incomplete. The table below shows some results for comparison with those of Drs Lunn and Johnson.

In my opinion the secret of success in using the tine test is to exert sufficient finger pressure and sustain it for about five seconds, even to the point when occasionally one may draw a little blood from one of the needle sites. The clean, hairless skin of the forearm does not require any special treatment. The reading is best carried out at about the seventh day to suit the convenience of the staff, whose commitments, hospital and private, often militate against follow-up appointments on a rigid schedule. If in doubt repeat tests by the operators who carry out the BCG immunisations are essential for good control.

I realise that my percentage of tine positives is much higher even than the 59% recorded for the Mantoux test by Drs Lunn and Johnson, but in practice my system seems to be quite adequate from the epidemiological point of view in tuberculosis detection and in prevention of cross-infection.

I appreciate that the British Thoracic Association study was carried out by a number of experts and observers which I could never equal, but even so I hope that others who have used the tine test will give their results. I also make a plea for an immediate investigation to try and explain the different results from different operators, otherwise the official report of the Tuberculosis Subcommittee, so carefully documented, will be accepted and lead to the premature appointment of many clinical medical officers to do Mantoux testing for which, in my opinion, there is no need.

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Treatment of hyperhidrosis

SIR,—I read with interest the paper by Dr K T Scholes and others (8 July, p 84) on the treatment of axillary hyperhidrosis with a solution of alcoholic aluminium chloride hexahydrate.

Over the past three years I have treated 42 patients with hyperhidrosis using the same treatment; 28 had axillary hyperhidrosis, 10 palmar hyperhidrosis, and four plantar hyperhidrosis. A total of 30 patients found the treatment satisfactory. These consisted of 22 patients with axillary hyperhidrosis, six with palmar hyperhidrosis, and two with plantar hyperhidrosis. Six of the patients found the aluminium chloride hexahydrate too irritant to apply to the axilla and I have made note of the comment by Dr Scholes and his colleagues that topical application of hydrocortisone cream could well control the symptoms.

Of the 30 patients who did well, 24 were delighted with the response and six were moderately pleased. All patients would have been referred for surgery if the therapy had not worked, as previous treatments had failed. Out of a total of 42 patients, only three have been referred to the surgeons for either a sympathectomy or excision of the axillary glands.

All the patients have continued to use the therapy. In some cases treatment is required daily but in eight the preparation needed to be applied only every second or third day.

Thus these data are in broad agreement with the findings reported by Dr Scholes and his colleagues and we conclude that the topical application of a saturated solution of aluminium chloride hexahydrate, particularly in axillary hyperhidrosis, can in many cases obviate the need for surgery.

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SIR,—Undoubtedly concentrated solutions of aluminium compounds should in general be the treatment of first choice for axillary hyperhidrosis, as advocated by Dr K T Scholes and his colleagues (8 July, p 84). It was interesting to read that they found the use of polyethylene film wraps to be unnecessary, as I had always suspected. However, their paper, largely based on the results of a questionnaire sent to patients, gave no details of the questions asked or detailed analysis of replies (apart from their promptness). We are left to wonder whether "highly delighted" meant just marked improvement or the achievement of a normal or less than normal degree of sweating all the time.

Surgical excision does have its failures and complications, but cryotherapy offers a reasonable alternative for more severe cases. Not every patient would wish to apply highly corrosive fluid to the axillae every few nights for up to 40 years, and one wonders about possible long-term hazards arising from the chronic irritation involved. With modifications of the technique described originally¹ both axillae can be treated in 20 minutes at one session. By using a more recent model of nitrous oxide cryoprobe and by bunching up the axillary skin round the 18-mm diameter discoid tip each axilla requires only three to four applications lasting 40 seconds. The procedure is done under local anaesthesia, but now patients are routinely given pentazocine 30 mg intramuscularly at its conclusion and kept at the hospital for two hours because of the frequent occurrence of stinging pain on thawing in the first hour or so. This routine, which has been evolved over the treatment of 40 patients, gives full control in most cases. Small in-between or marginal areas which have escaped full freezing have in only a minority of patients needed to be further treated by one or two applications at a later date. Blistering is usual; the occasional patch of full-thickness skin loss is usually very small and, if it occurs, healing takes place in about a month. The permanent effects are partial depigmentation and depilation—the latter usually complete enough to please.

One 19-year-old man treated had marked psoriasis, including the axillae, and the application of a corrosive might have been unwise. Cryosurgery not only dealt with the

Tine test results, 1976-7

Year	Total	Tine positive	Tine positive (mild)	Negative	BCG immunisation
1976	252	215 (85.3%)	12 (4.8%)	25 (9.9%)	24
1977	209	166 (79.4%)	15 (7.1%)	28 (13.4%)	24