

how to cope with the addicts. Methadone linctus 10-20 mg. is recommended if there are withdrawal symptoms. In the same circular he draws attention to the possibility that some addicts may switch from heroin to intravenous amphetamine (see also page 754).

If several thousand young people do attend the centres for a regular supply of heroin what happens to them? Whether any but a few addicts on several grains of intravenous heroin per day can function socially and hold down jobs is still a matter of conjecture, and it is possible that the longer a person is on maintenance drugs the longer is he being exposed to an experience which damages his social adjustment and personality. The serious risks to life and health inherent in heroin-taking are brought out by Dr. T. H. Bewley and his colleagues in three papers in the *B.M.J.* this week. They calculate a 20- to 35-fold excess mortality rate among British heroin addicts, and they point out that, despite free prescribing here, the death rate among heroin addicts in Britain is over twice that of addicts in New York.

For these various reasons the steady aim—rather than the pious hope—of the clinics must be to get their clients off heroin. To design a regimen which offers the disturbed adolescent drug-taker a recognizable alternative to being an addict is considerably more difficult than merely to go on handing out drugs to him. Nor do the problems end there, for the continuing care of the addict after his treatment at one of these centres needs to be unremitting. The Ministry of Health has issued an admirable memorandum<sup>3,4</sup> advocating the setting up of hostels, but how the money or staff will be found remains uncertain. To think of "aftercare" as such is unreal, for treatment cannot be conveniently divided into stages. The most hopeful strategy would be a policy which integrated treatment centres with clubs, community centres, and workplaces where workers reached out to addicts, coupled with the provision of hostels for some of them to live in temporarily. If ever community psychiatry is to have meaning it is in the treatment of drug addiction; psychiatry which sits back in the clinic will merely watch the tide come in.

## Spontaneous Pneumothorax

Laennec<sup>1</sup> knew that emphysematous blebs could cause pneumothorax, but the disease was usually attributed to tuberculosis until H. Kjærgaard<sup>2</sup> and later K. M. A. Perry<sup>3</sup> established a non-tuberculous aetiology in the majority of their cases. It is now accepted that spontaneous pneumothorax most commonly results from the rupture of a subpleural bleb or bulla, and such lesions are usually found at thoracotomy even when they are not apparent in a radiograph.<sup>4</sup> The bleb may result from a congenital fault or inflammatory scar associated with a check-valve mechanism due to partial obstruction of a peripheral airway; or it may be one part of a more generalized emphysema. Among the rarer causes of pneumothorax are silicosis, bronchial carcinoma, honeycomb lung, congenital and parasitic cysts, lung abscess, pulmonary infarction,<sup>5</sup> and endometriosis.<sup>6</sup>

Several factors are said to precipitate actual rupture of the lung. Strenuous physical effort is the one most often quoted in textbooks, but there is little evidence to support this theory. Respiratory infections have long been blamed, and indeed pneumothorax is rather more frequent in the winter than in the summer months.<sup>7</sup> Other precipitating causes include positive-pressure respiration,<sup>8</sup> corticosteroid therapy,<sup>9</sup> and menstruation. Right-sided spontaneous pneumothorax occurring at the onset of the menses (and sometimes but not invariably associated with pulmonary endometriosis) was described by E. R. Maurer and others in 1958,<sup>6</sup> but it has lately been reported more frequently.<sup>10-12</sup>

Excellent descriptions of the clinical features of pneumothorax are available in standard textbooks. However, successful diagnosis rests on an awareness of probability as well as a knowledge of signs. The increasing recognition of myocardial and pulmonary infarction in previously healthy young men has distracted attention from pneumothorax as an alternative cause of sudden chest pain and dyspnoea. This tendency has been encouraged by the belief that spontaneous pneumothorax, like tuberculosis, is on the decline—a belief which has now been refuted in a study of nearly a thousand cases among R.A.F. personnel.<sup>7</sup> In this relatively closed community it has been possible to calculate the annual incidence of pneumothorax in otherwise normal young men. It has increased from about 0.25 per 1,000 in the 1950s to over 0.4 per 1,000 in the 1960s, and tuberculosis was incriminated in none of these cases.

The prognosis of spontaneous pneumothorax depends on the cause. It is a dangerous and often mortal complication of obstructive airways disease in older patients. On the other hand, complete recovery is the rule in the larger group of young men with relatively healthy lungs,<sup>13-15</sup> and in them there is little residual impairment of lung function.<sup>16,17</sup> Considerable controversy pervades the management of pneumothorax, especially in this latter group. Some clinicians withhold treatment in the majority of cases<sup>14,15</sup> and even permit some patients to continue at their work.<sup>13</sup> Others recommend immediate re-expansion of the lung by intubation to ensure a more rapid and lasting return to normal function.<sup>18</sup> The prevention of recurrence is also the subject of debate. The rate of recurrence reported in the literature varies from 10 to 60%,<sup>4</sup> though in most large series the rate is around 20%.<sup>7,18</sup> This uncertainty may account for the widely differing attitudes towards prevention. At one extreme are those who advocate bilateral pleurectomy after the first attack of pneumothorax<sup>19</sup> and at the other those who believe that

<sup>1</sup> *Brit. med. J.*, 1967, 4, 366.

<sup>2</sup> Ministry of Health Scottish Home and Health Department. *Drug Addiction*. The Second Report of the Interdepartmental Committee. 1965. H.M.S.O.

<sup>3</sup> *Brit. med. J.*, 1967, 4, 436.

<sup>4</sup> Ministry of Health Memorandum. 1967. HM(67)83.

<sup>1</sup> Laennec, R. T. H., *De l'auscultation médiate, ou traité du diagnostic des maladies des poumons et du cœur*, 1819. Paris.

<sup>2</sup> Kjærgaard, H., *Acta med. scand.*, 1932, Suppl. No. 43.

<sup>3</sup> Perry, K. M. A., *Quart. J. Med.*, 1939, 8, 1.

<sup>4</sup> Gobbel, W. G., Rhea, W. G., Nelson, I. A., and Daniel, R. A., *J. thorac. cardiovasc. Surg.*, 1963, 46, 331.

<sup>5</sup> Blundell, J. E., *Brit. J. Radiol.*, 1967, 40, 226.

<sup>6</sup> Maurer, E. R., Schaal, J. A., and Mendez, F. L., *J. Amer. med. Ass.*, 1958, 168, 2013.

<sup>7</sup> Cran, I. R., and Rumball, C. A., *Thorax*, 1967, 22, 462.

<sup>8</sup> Nennhaus, H. P., Javid, H., and Julian, O. C., *Arch. Surg.*, 1967, 94, 136.

<sup>9</sup> Olsen, K. H., and Quaade, F., *Lancet*, 1961, 1, 535.

<sup>10</sup> Kovarik, J. L., and Toll, G. D., *J. Amer. med. Ass.*, 1966, 196, 595.

<sup>11</sup> Collins, T. F. B., *S. Afr. med. J.*, 1967, 41, 391.

<sup>12</sup> Davies, R., *Thorax*, 1967, 22, 482.

<sup>13</sup> Beumer, H. M., *Amer. Rev. resp. Dis.*, 1964, 90, 261.

<sup>14</sup> Hyde, L., *Dis. Chest*, 1963, 43, 476.

<sup>15</sup> Stradling, P., and Poole, G., *Thorax*, 1966, 21, 145.

<sup>16</sup> Williams, M. H., and Kane, C., *Dis. Chest*, 1965, 47, 153.

<sup>17</sup> Heckscher, Th., Larsen, O. A., and Lassen, N. A., *Scand. J. resp. Dis.*, 1966, Suppl. No. 62, p. 31.

<sup>18</sup> Ruckley, C. V., and McCormack, R. J. M., *Thorax*, 1966, 21, 139.

<sup>19</sup> Baronofsky, I. D., Warden, H. G., Kaufman, J. L., Whately, J., and Hanner, J. M., *J. thorac. Surg.*, 1957, 34, 310.

<sup>20</sup> Poole, G. W., *Thorax*, 1967, 22, 482.

<sup>21</sup> Bromley, L. L., *Thorax*, 1967, 22, 482.

pleurodesis of any kind is "usually unnecessary and often undesirable."<sup>20</sup>

On certain aspects of management, however, there is a fair measure of agreement. A shallow pneumothorax in a young patient with radiologically normal lungs can usually be left alone provided close surveillance is maintained until the lung is fully expanded. A pneumothorax which is slow to resolve, or reduces the lung to less than half its normal volume, or causes dyspnoea and mediastinal displacement (especially in older patients and those with diffuse lung disease) calls for the insertion of a catheter attached to an underwater seal. Bronchoscopy to exclude carcinoma or to aspirate mucous secretions is indicated when there is absorption collapse of the lung. If, despite these measures, the lung fails to expand the pleural surface should be inspected at thoracoscopy or thoracotomy. Bullae or emphysematous segments of lung can then be excised, leaking points oversewn, thickened pleura removed, and some form of pleural fusion carried out to keep the lung expanded.

Pleurodesis to prevent recurrence is usually deferred to a second or subsequent attack of pneumothorax unless there are special risks, as in the case of air crew,<sup>7</sup> people living in areas remote from medical aid, and some patients with underlying lung disease. Parietal pleurectomy is probably the surest method of preventing a recurrence,<sup>17-21</sup> but this does entail a major surgical operation and can lead to technical difficulties if thoracotomy is subsequently needed to deal with other diseases of the heart or lungs. Some workers claim that less drastic action at thoracotomy such as talc poudrage or gauze abrasion is equally effective.<sup>4</sup> The "blind" instillation of an irritant substance into the pleural cavity—for example, kaolin, talc, silver nitrate, glucose, olive oil, or blood—still has its advocates, but these procedures can be extremely painful, may in some cases lead to fibrothorax,<sup>4</sup> and too often fail to prevent a recurrence.<sup>21</sup>

## ✕ Gas Gangrene from Adrenaline

There are two essential factors in the production of gas gangrene. These are the implantation of clostridial spores (almost always those of *Clostridium welchii*) in muscle, and a lowered oxygen tension permitting their germination and initial growth.

In traumatic gas gangrene the source of the spores is usually dirt contaminating the wound, and the anoxia results from crushing or deprivation of blood supply. When the infection follows high thigh amputation, as was pointed out in these columns a few months ago,<sup>1</sup> tissue anoxia can be the consequence of the arterial disease which has necessitated the amputation, perhaps aided by ligatures here and there, and the source of the organisms is likely to be the patient's own skin. *Cl. welchii* is a normal inhabitant of the bowel, and intestinal bacteria have a much wider skin distribution round the anus than is usually recognized. Its limits are not fully ascertained, and it might be an instructive exercise to map them.

A third example of the same kind of process is the production of gas gangrene by an injection of adrenaline. Death from overwhelming infection resulting from a therapeutic

injection in, for instance, a young asthmatic is not an occurrence to publicize, and some such tragedies must have gone unreported, if only from fear of litigation. This week in the *B.M.J.* Drs. P. W. Harvey and G. V. Purnell describe an instructive case of this kind (page 744), disclosing neither where nor when it occurred, though it was "some years ago." Some other authors, particularly in France and Australia, have had the courage to publish such reports. It has often been assumed that non-sterile syringes have been the source of infection. Such syringes used often simply to be stored in spirit, and it is known that spirit itself may actually contain spores of *Cl. welchii*. When the subject was reviewed in this column seven years ago<sup>2</sup> it was pointed out that another possible source of infection was the skin. In two of the three cases reported by V. Marshall and P. Sims<sup>3</sup> the injection had been given into the buttock. That was the site of injection in the case reported this week, with the added suspicious feature that the patient had been incontinent and that an indistinguishable strain of *Cl. welchii* was cultivated from his faeces. The authors conclude that the buttock as a site for injecting adrenaline should be avoided "whenever possible." Two non-fatal instances of subcutaneous infection by *Cl. welchii* after injections into the buttock in incontinent old men are also reported.

The lesson of this case is surely that adrenaline should never be injected in the buttock. The suspicion that the infection which can so be produced is autoogenous is overwhelming. As to the second factor, the vasoconstriction produced by adrenaline provides the necessary lowered oxygen tension. It is significant that the adrenaline given to Harvey and Purnell's patient was a preparation, no longer available, which was particularly long-acting. That used by Marshall and Sims<sup>3</sup> and by J. I. Tonge<sup>4</sup> was adrenaline in oil, another preparation devised for slow release.

It may well be asked whether disinfection of such skin is possible if puncture or incision is necessary. Bacterial spores are indifferent to any disinfectant which the skin will tolerate except halogens, and iodine in its ordinary forms, if not permitted to dry (which arrests its effect), would not be tolerated for long enough. E. J. L. Lowbury and his colleagues<sup>5</sup> showed that an iodophor, which is a better tolerated but less active type of iodine solution, if applied in the form of a wet compress to skin artificially contaminated with spores of *Bacillus subtilis* will kill over 99% of these spores in 60 minutes. They also showed in a separate in-vitro experiment that spores of *Cl. welchii* are no more resistant than those of *B. subtilis* to this disinfectant. It cannot safely be assumed that bacteria normally resident on the skin are killed with the same facility as those artificially applied. Nevertheless, this kind of skin preparation may be a wise precaution before operation in such an area. It is obviously too tedious as a prelude to mere injection, and the remedy for this is simply to go elsewhere.

## Ergonomics and Medicine

In the last 20 years there has been a remarkable revolution in which increasing numbers of items of furniture, domestic equipment, and industrial machinery have been designed according to rational principles and not merely to please the eye of the designer. Poor functional design can be a source of discomfort, fatigue, and poor posture; and a recent report from Australia<sup>1</sup> draws attention to the widespread

<sup>1</sup> *Brit. med. J.*, 1967, 4, 68.

<sup>2</sup> *Brit. med. J.*, 1961, 1, 730.

<sup>3</sup> Marshall, V., and Sims, P., *Med. J. Aust.*, 1960, 2, 653.

<sup>4</sup> Tonge, J. I., *Med. J. Aust.*, 1957, 2, 936.

<sup>5</sup> Lowbury, E. J. L., Lilly, H. A., and Bull, J. P., *Brit. med. J.*, 1964, 2, 531.