

notes, scraps of paper, and questioning other people it was eventually found that that patient had been given on no less than three occasions an adequate dose of pethidine between having the accident and arriving in the theatre. It was extremely difficult to find out just when and where, and it was not until it was all over that we discovered that it had been given subcutaneously. In a shocked patient a subcutaneous injection just lies there without being absorbed into the general circulation perhaps for an hour or two. When this patient was put to sleep in the theatre a little circulation began again and picked up the three little doses of pethidine and of course his respiration was greatly depressed. No harm came of it, but it is a lesson. The use of pain-relieving drugs is rather wasted if one has to wait hours for them to be picked up by the general circulation in the shocked patient. Intravenously they will work inside about a minute, so I would suggest that on some of these occasions intravenous morphine or pethidine be given where it is necessary to relieve pain. An immediate and adequate record should be made somewhere in the patient's notes, or even on the patient, so that there is no doubt what the patient has already received.

Where the patient is very elderly, the dosage should be adjusted accordingly. I have seen patients of over 90 come into hospital and shortly after arriving drop off into a remarkably profound and lengthy sleep, because they had had the dosage of morphine or omnopon suitable for a young athlete. At 90, the dosage is very much less than for the fit young man. One other point concerns posture. If a patient is unconscious and injured and is being sent into hospital, to send him in lying on his back is unwise, to say the least of it. More than once I have seen death from vomiting with the patient lying on his back. Patients with injuries of the head, face, mouth and nose, should all be put in the lateral or semi-prone position, sometimes called the tonsil position; many a tragedy will be avoided by such a simple little point.

DISCUSSION

T. G. Lowden, F.R.C.S. (*Casualty Surgeon, Sunderland Group Hospitals*): I propose to discuss the treatment of minor injuries, and not minor injuries that look like major injuries. I think we should talk, for instance, about cut fingers. If a patient comes to you with a cut finger, do you sew it up? If you sew it, how do you sew it? Do you sew up a cut on the back of his finger and on the front of

the finger the same way? Do you treat it the same way if he has cut a bit of it right off? Do you treat it the same way if it has taken him two or three days to come and tell you about it? Do you use antibiotics, and, if so, which ones do you use, and how much do you give? Once could talk in this sort of way about all minor injuries, and there are dozens of varieties of them: cuts, bumps, bruises, scratches, sprains, little burns, and cases of acute superficial sepsis. If you have a case of acute superficial sepsis, such as septic hand, do you incise it or do you dissect it out as a little surgical problem? Do you wait until it is rotten or do you intervene as soon as you know you must? Do you go into it through clean, firm, vital, normal tissue above it? Do you use antibiotics, do you always use antibiotics, what antibiotics do you use, and how do you know when you are right? Those are only some of the things which interest those of us who are widely concerned with minor injuries, and we are beginning to realize that not only major injuries but also minor injuries are a major problem; further, that there are major changes in the treatment of minor injuries. Most of us do not appreciate that we do not put them into practise. I am not going to enter into the controversy as to who should treat these injuries. What may be right for Birmingham is not right for Sutherland. When we decide what should be done, we have got to appreciate that what is right for one place is wrong for another. The most important and critical decision is where we should do it? But whoever does it, and wherever and whatever the arrangements are, these are the things which we ought to decide.

A. A. White, M.D. (*Senior Medical Officer, Austin Motor Co.*):

Mr Gissane made direct reference to the importance of industry in contributing to the case-load of minor injuries which we are discussing, and Dr McGregor estimated that 26 per cent of his casualties occurred in the course of employment. I know of no national figures, but in my own factory last year some 17,000 work people contributed a total of 42,000 first attendances with minor injuries, at somewhere over two each, so in the working population of 24 million in the country as a whole the grand total should be considerable.

Although there is no provision under the health service for any treatment facilities, there is provision under the Factories Act for first-aid treatment, and I think it a matter of the utmost importance that practitioners should have a good notion of the kind of treatment available to their patients when they are injured at work. Quite a lot of information has been collected, but I have not seen evidence that much has been done on the basis of the knowledge gained, so I would quote to you from a report compiled by no less

an authority than H.M. Factory Inspectorate on the provision of first-aid treatment in factories in Halifax. They surveyed 760 factories in that town, looking at what the patient had got or what was available for the injured patient at the place of work. As you know, first-aid boxes are required under the statutory provision for factories employing up to 50 people; above that figure the person in charge of the box must be a responsible person trained in first-aid; bigger factories have multiples, over 150 people requiring two first-aid boxes and two first-aiders. A description of a first-aid box and its contents as commonly found would be this: the box, which would tend to be somewhat dirty rather than clean, contained an assortment of roller bandages, a partially used open roll of surgical lint, the outer layer of which would be decidedly dirty, a partially used roll of adhesive plaster, and a tourniquet. A few sterilized wound and burn dressings in various prescribed sizes would probably be available, some opened, and almost certainly there would be a reasonable stock of adhesive wound dressings, though they would be in the form of continuous strip dressing and not of individual dressings. A choice of antiseptics would be provided including a proprietary one and acriflavine lotion or emulsion. Eye-drops, commonly in two varieties, labelled "factory eye-drops No. 1" and "factory eye-drops No. 2" and sal volatile would also most likely be present. Finally, the average box might well contain a bottle of aspirin tablets, a patent cough mixture or similar medication, probably a record of treatment but no instructions as how to carry it out. The name of the person in charge would not be displayed but he would be well known and in a small factory this omission would not be of much moment.

The significance of this state of affairs, which applies to the smaller factory, is brought home if we consider the distribution of work-people in factories. About three and a half million people are employed in factories of less than 250 hands. Not all these are badly equipped and I would refer to a further survey conducted by the Medical Inspector of Factories to cover this very point. They surveyed 210 factories, 3 groups of 70 each, up and down the country. Of the 70 factories employing less than 250, 49 did not even employ a trained nurse; even more surprising, 16 out of 70 factories which employed between 250 and 999 workers had no trained nurse, and even more surprising still, out of the 70 factories that employed over a thousand people three had no trained nurse. There can be no spread of knowledge of the best type of practice, the best type of first-aid dressings, or even what to do, unless there is some sort of contact between the floor of the shop and authoritative sources—advanced places like accident hospitals, traumatic clinics elsewhere, and even individual doctors. The person

the patient comes in contact with has no knowledge and there is no better supervision than the kind indicated in these researches. The position though is not one of wholly unrelieved gloom, for here and there are bright spots. I would refer particularly to two centres; one at Slough where the small factory is very adequately covered by a new type of industrial health unit of professional industrial medical officers which has started there and is run by Dr Eager; there is an equally interesting one at Harlow New Town which has an industrial estate where there is a similar organization run and staffed entirely by general practitioners. We realize that there can be no one rule universally applicable. The trend of things at the moment in industrial development is for the formation of trading estates, and I would leave you with the thought that there might be a very big field of work for general practitioners on these trading estates along the lines which are being developed at Harlow.

The Chairman: I was particularly fascinated with Dr Fergusson's paper. One forgets that these conditions occur in this small island, though one is familiar with them in big countries like Australia and Canada. I think it was a fascinating paper that really emphasized the point that Mr Lowden makes, that there cannot be one pattern for accident services in every part of this country. There are particular problems everywhere. But I do not know whether Mr Lowden meant that there should not be a fundamental organization where everyone knew where things could be obtained—teaching, treatment, etc. The detail of the pattern must obviously differ in densely populated areas such as this region and the western corners of Scotland.

Question: Mr Lowden, when should I stitch a finger? What difference is there between stitching the back and the front? When should I give an antibiotic and why should I give an antibiotic?

Mr Lowden: I make not the slightest suggestion that nobody should know what they do in an accident service, or that we should not do anything about an accident service. In fact I am very much with Mr Gissane in the opposite direction. What I do feel is that it is no good having one, and only one, blueprint for accident services.

As to the cut finger, if the true skin has been cut right through in any laceration I think that the true skin gap should be closed as soon as possible after it has been adequately cleaned. Therefore any cut which has gone through the whole thickness of the skin down to, or further than, the subcutaneous tissue should be securely closed by suture, if it is possible to do so before there is any infection. I think that you should put in so many stitches, so close together, that there is no bulging of subcutaneous tissue through the wound,

and I teach my house surgeons—when I have any—that a wound is not properly closed unless they have reconstituted the fingerprints. They do not do it, and I cannot, but it is a good idea and it is a good standard. If a wound on the front of the finger is close to the mid-line and it crosses any of the creases, and is sewn up as it was originally made, look out for trouble, because it may well in the next two or three months pull that finger down. If you cut a finger on the back or on the side, to the same depth and the same length, you will not get that trouble and you can forget it when it is healed. If a cut is clean and has been treated quickly, it can be cleansed mechanically with soap and water, the skin reconstituted without tension, and kept dry. Such cuts will get better, just as quickly and just as successfully, without any antibiotics. If there has been delay in attention, or breakdown is feared for any other reason (the commonest cause of breakdown is not originally sepsis but avascular necrosis of the edges of the wound due to tight suture) an antibiotic should be used.

The Chairman: One of the problems of sepsis, not only in wounds of the finger but wounds elsewhere, is the failure to realize the surgical principle of wound cleansing before wound closure. It is important to cleanse it properly, sometimes extending the wound so that you are certain that you have seen into its depths and removed all foreign material or all dead material. If you have seen this and you know the tissues are viable, you can suture up quite tightly and forget all about antibiotics. I see many wounds that are sutured without that thought behind them, sometimes by doctors, more frequently by nurses. The suture of wounds alone is not good enough.

Question: I would like to raise two points. First, if there is anybody from a teaching hospital here, will they please convey to the Faculty of Anaesthetists the message that students should be trained to use the rag and bottle, not by standing over them but by waiting in the next room until the student shrieks for help. We must be given enough of it to do, for we cannot learn it by reading it out of a book. The other point concerns first aid. Should the doctor at the roadside withhold an analgesic on the grounds that the houseman, the registrar, and the anaesthetist won't read the label or letter that one sends with the patient?

Dr Bigley: It is an excellent thing to use and to be taught to use the rag and bottle. First, foremost and perhaps for ever, the signs of anaesthesia and maintenance of a clear airway are taught better with a rag and bottle than with anything else. As regards the second point, I quite see the little problem you have. I think that at the roadside if one has a syringe and ampoule of omnopon, and if the

patient is in pain (because patients do not always complain of pain in a major injury or relatively major injury) I would give the analgesic drug but I would give it intravenously. Secondly, I can speak certainly for one hospital that does read anything that comes in from a doctor. One of the first things I do after asking the patients in the shock room if they have had anything to eat or drink recently is to look around to see if they have had any drugs recently, and then I find your piece of paper. It is quite wrong to assume that this will not be read or looked for.

The Chairman: The little piece of paper is not always with the patient, and the information is not always handed over to the hospital receiving the patient. I wonder whether it would not be better to use a skin pencil, writing "Morphine gr. $\frac{1}{4}$ " on the forehead. Then we would see it.

Previous questioner: Further to that, one's wife's lipstick comes in handy; secondly, some practitioners I know who carry a first-aid kit of analgesics around with them also carry half a dozen or more luggage labels which they attach to the patient either by the ear or the lapel.

Dr Leak: I am delighted to hear that Dr Bigley would teach the rag and bottle method, but I am very worried about how he is going to teach administration of chloroform if, as he says, he does not know how to do it. This really is not so much a problem from the point of view of accidents, but it is a very real problem from the point of view of midwifery.

The professors at Manchester would much prefer their students to know how to give a little chloroform during labour; it is far and away the best of the ordinary anaesthetics to use, but they do not know how to get it done. They dare not do it themselves, and the anaesthetists will not teach them. I have discussed it time and time again. Professor Newton says he cannot allow any student to use chloroform in hospital because if anything went wrong the coroner would say "Why did you use chloroform?" And it really is one of the great problems in obstetrics in this country that students are not taught the use of chloroform. Not only in this country but particularly abroad, where it is too hot to use ether and even chloroform is nearly boiling. I think chloroform, if you know how to use it, is a very safe anaesthetic and I hope Dr Bigley will give some thought to this problem and perhaps go and learn how to use chloroform from somebody who could teach him, and then teach his students.

The Chairman: Is it not the fact that chloroform is indeed the most dangerous of all the inhalation anaesthetics?

Dr Fergusson: I think I've been a very naughty Scot indeed by

raising this question of chloroform at all, but I just could not resist the temptation. As other speakers have said, those of us who have been taught how to use it do find it a very effective and useful anaesthetic. Ether is all very well, but it is inflammable and has many other disadvantages, and any of you who have had an ether induction, as I have had, would not like to have a second one. With regard to the giving of morphine, I quite agree with Dr Bigley. The surest way of getting benefit from it, particularly in shocked people, is to give it intravenously, with one proviso—where there is going to be a long delay before the patient is in hospital, it may be necessary to give it intramuscularly so that the patient will get benefit from it not now but two or three hours hence. The patient may not be feeling pain when you see him whilst he is shocked, but when that shock wears off he may suffer quite a lot, particularly if he has to be bumped in some of our ambulances over very rough roads.

The Chairman: There can be no question at all about chloroform being a convenient anaesthetic but the point I am trying to get over is, is it a safe anaesthetic? As far as my knowledge goes it is not a safe anaesthetic. Now could we have the expert on this?

Dr Bigley: I am no expert on chloroform. I am happy to teach the rag and bottle method, but not with chloroform. I use ethyl chloride and ether. I would not dream of teaching chloroform because I have not been taught myself. I came in just a little too late for that, and I wish someone would teach me to use chloroform. But here we do move a little out of medicine and we move into the coroner's court unfortunately. Patients may die with any anaesthetic but not because of the anaesthetic. Every time a patient dies who is having an anaesthetic it is not because of the anaesthetic but because of injury, the surgical operation, blood loss, and so on. Anaesthetics rarely kill people today, but if they do die under chloroform, the anaesthetist has to go into the coroner's box and the coroner will say "Was it not possible to use any other anaesthetic, Doctor?" And it's not very easy to say that this was the only possible one. I am afraid we are taught by the law but not by medicine in this. Chloroform is certainly not without its dangers; it is a dangerous anaesthetic in hands that do not know how to use it. Chloroform is a wonderful anaesthetic; it is tremendously powerful, it doesn't burn, it is relatively non-irritant, and it is tremendously portable. But it has a sting in the tail; there are ways in which chloroform will kill, suddenly and quickly, certainly in the hands of the non-expert. Like a number of other things, some of them in anaesthetics as well, the use of chloroform is a dying art, but what we must hope is that it does not become a dead art.

Dr Bosc: In my experience in midwifery anaesthetics, I find

chloroform an excellent anaesthetic for rag and bottle work, but it can be a very deadly anaesthetic when entrusted to a nurse. I hope that district nurses are never trusted to give chloroform anaesthetics.

A member: The Army in conjunction with Dr Bourne from Mass Casualties has developed the Sparklet cyclopropane, oxygen and CO₂ apparatus which they say is non-explosive in a little Sparklet for attachment to a breathing bag which fits on to a facemask. When the Sparklet is turned on the contents fill the bag, which is strapped on the patient's face; the patient is asleep in approximately 45-60 seconds and will remain fairly calm for between 3 and 5 minutes. It can be reapplied at least three times. However, I don't know whether it is a practical proposition.

Dr Bigley: The method of using cyclopropane in a small cylinder with carbon dioxide so that it is rendered non-inflammable and non-explosive is a very useful thing indeed. It has been used for some time now in that mixture and it may well be the answer to Dr Fergusson's problem. But one has to bear in mind all the time with these anaesthetic methods that a clear airway is fundamental and one must know what the anaesthetic drug will do for good and for ill.

There is a tendency sometimes when a new method of this sort comes out in a nice, small, compact bag to forget that it presents little problems. Before using any of these methods and certainly before leaving them in the hands of untrained or unskilled assistants, such as nurses, it must be remembered that they are full of little dangers of one sort and another. The patient must be kept oxygenated and must be getting rid of his carbon dioxide all the time, blood pressure must be watched, and so on. This is not in any way a condemnation or criticism of the new method. It is probably extremely useful but it must be used skilfully and above all safely.

Dr Filer, M.B., B.CHIR. (London): I am faced with a different problem from Dr Fergusson who has one hospital 50 miles away. I come from an over-hospitalized area. I have three hospitals within a very short radius; one is a postgraduate hospital and there are two older hospitals. I qualified two or three years ago, and I was always taught that injuries to the hands were potentially very serious, because hand function is absolutely vital, and that a hand injury should be treated with great respect. In general practice, people come to me with hands that require simple suturing. I'm faced with the problem of either doing this myself or else sending them off to hospital where (a) they have to hang around; (b) the job is often done by people who have qualified even more recently than I have.

If however there is litigation and I have sutured the hand myself, I am asked why the case was not referred to hospital. The other point concerns rehabilitation and getting people back to work quickly. I had a man from a brewery who dropped a crate on his foot and broke his big toe. We got him walking quite nicely with the toe of the boot cut out, and I suggested that he went back to work. I had the union secretary round to see me and there was practically a strike on; it was absolutely unheard of, I was depriving this man of his legitimate right to have four weeks off, and if I sent him back to work and everybody else went back to work there would be absolute chaos. I haven't heard this legal aspect of injuries mentioned so far.

H. Shire, M.D., CH.B., D.C.H. (Birmingham): Aren't we getting a bit overconscious of this question of litigation and the coroner? If we go on like that we will soon get to the state where nobody will do anything, unless it's done by persons like yourselves who presumably are immune from coroners' strictures. May I also make an appeal to support Dr Fergusson in what he had to say about A.T.S. and tetanus immunization. The hospital staff give the A.T.S. injections and the general practitioners see the reactions. I feel that the question of tetanus immunization should be tackled on a further, and national scale.

The Chairman: The last speaker has a point that might be pushed very hard by the College of General Practitioners. We, as a hospital, are very well aware of the need for active immunization against tetanus at an early age. This is something we have been trying to push for years, but it's an extremely important function of the general practitioners, particularly of their College, to use their power in forcing necessary legislation.

D. E. Howells, M.B., B.S. (London): Two counties, Middlesex and London, at the moment are encouraging immunization for tetanus. They are giving general practitioners 5/- in return for sending them a card with two entries indicating two injections of tetanus toxoid.

The Chairman: I am sorry to hear that, because we are doing the same thing in Birmingham, but we are not giving the general practitioners 5/-.

S. P. S. Oswald, M.B., B.S. (Solihull): I should like to add Warwickshire to that list. We in our practice for some time now have been pushing active immunization, but I think Warwickshire are starting officially this year, having put it on their list for combined triple immunization together with diphtheria and whooping cough vaccines. Our difficulty is that we go to a lot of trouble to immunize these people actively, and when they go to hospital with their various injuries they are automatically given antitetanus serum. Nobody

asks whether they have had active immunization before, but all the casualty officers give A.T.S. and so our trouble is wasted. The child or adult is subjected to the risk of anaphylaxis to no good purpose, all quite unnecessarily. I think a good deal of propaganda needs to be done within the hospital as well.

The Chairman: The difficulty is to get a universal pattern right through the country. If everybody was doing the same thing it would be easy, but because we are all doing different things it becomes a little confusing.

Mr Lowden: I think the great difficulty is that patients do not know what immunization they have had; that is one of the reasons why they may get A.T.S. when they have in fact been actively immunized. Casualty departments are well aware that there is such a thing as active immunization and some of them carry it out as a follow-up process, but the great difficulty is to know whether it is all right to give toxoid or not, because the patient doesn't know what sort of immunological state he is in. It's altogether apart from the question of whether he is conscious or not; even when he is conscious he doesn't seem to be conscious of that.

THE MANAGEMENT OF BURNS

J. P. Bull, M.A., M.D.

(Director, Medical Research Council's Industrial Injuries and Burns Research Unit, Birmingham Accident Hospital)

Burns and scalds range clinically from some of the most minor domestic injuries to some of the most unpleasant and challenging causes of accidental death. Between these extremes come most of the industrial burns, due to a great variety of causes—molten metal, chemicals and electricity. In our burns unit, of the approximately 300 annual admissions, two thirds are of a domestic origin and one third industrial. Whatever the cause of the burn the clinical effects are surprisingly similar, and their severities are chiefly determined by the area of the injury and its depth.

There are three types of burns cases requiring hospital admission. First and most serious are the shock cases. These are the patients