long-stay patients are acquired. But this process is ultimately self-limiting, and we are now facing the more difficult problem of discharging the aged and the more severely disabled younger patients. It is easy enough to reduce the number of beds still further by adopting rigid criteria for the retention of such patients in hospital. Many of them would indeed be better off outside hospital, provided that they received sufficient support and aftercare. Can we honestly say that they will get it ?

In the All Saints' Group we are attempting to offer a wide and flexible range of facilities, including day care, hostel accommodation, industrial rehabilitation, and domiciliary visiting by doctors, social workers, and nurses. We try to review patients regularly at every stage of their programme of resocialization inside and outside hospital. Consequently the number of inpatients continues to decline at much the same rate as that described by Dr. Entwistle. We could have achieved the same result without such intensive efforts in community care simply by insisting that these patients were now the responsibility of the already overburdened local authorities and general practitioners. But this would be an unrealistic policy.

There is increasing (and probably justifiable) disquiet over the numbers of mentally and emotionally handicapped individuals at large in the community without adequate supervision, and it is unfortunate that the financial resources allocated to the psychiatric hospitals are determined largely by the number of inpatients. In fact the comprehensive service which we envisage requires considerably more able and numerous staff than would be needed if the same patients were allowed to remain indefinitely in hospital. To focus attention on bed occupancy without discussing the responsibility of the psychiatrist to the patient in the community is likely to give the false impression that our psychiatric services do not need to be extended. They do. But the additional investment must be channelled into hospital-based services which enable the mentally handicapped to enjoy a reasonably effective and tolerable existence among their fellow citizens.—I am, etc.,

All Saints' Hospital, Birmingham 18. MARTIN DAVIES.

Intramuscular Injections and Gas Gangrene

SIR,—The report of a fatal case of gas gangrene associated with intramuscular injections by Drs. P. W. Harvey and G. V. Purnell (23 March, p. 744), together with your leading article (p. 721) on this subject and the comments of Drs. T. H. Bewley, O. Ben-Arie, and V. Marks (p. 730), raise some important issues regarding the potential dangers of imperfect asepsis on which we would like to comment.

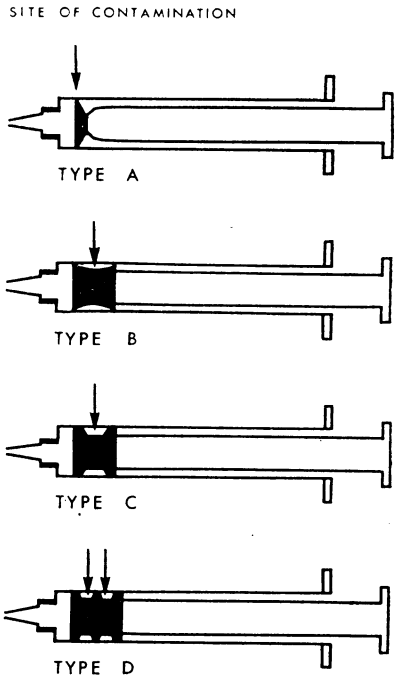
The danger of injecting adrenaline in the gluteal region is very properly emphasized in your leading article. In our book, *A Review of Sterilization and Disinfection*, p. 191,[1] we reviewed the infectious complications which may result from a simple injection given by qualified or unqualified persons, and went so far as to state, " There is little justification for the intramuscular injection of adrenaline in oil and its use should be discontinued." The case reported in your pages involved another long-acting form of the drug, the manufacture of which has now been discontinued. The risk of infection following self-administered injections, particularly among drug addicts whose standards of cleanliness are low, was also stressed by us in relation to tetanus and re-emphasized by Dr. Bewley and colleagues in respect to serum hepatitis. Recently we investigated the possible causes of a case of gas gangrene in a young woman who died following intramuscular injection into the buttock of 2 ml. of iron polymaltose containing 100 mg. of elemental iron. It is obvious, therefore, that deep intramuscular injections in this site of slowly absorbed vasoconstrictive or other irritant preparations carries a serious risk of gas gangrene.

While the most likely source of *Clostridium welchii* in these cases was undoubtedly the skin of the patient in the anal region, all the episodes investigated reveal some breach in aseptic technique, such as reliance on 5 minutes' boiling for the sterilization of syringes and needles or their storage in methylated spirits or 70% alcohol containing chloroxylenol. As it is now becoming obvious that these methods are inconsistent with professional standards of asepsis, an increasing reliance is being placed on commercially sterilized disposable syringes and needles, the use of which could become almost universal. In anticipation of this shift in practice, it seems appropriate to make a short comment on the sterilization of these articles. Many manufacturers use an ethylene oxide process for bulk sterilization, and the question immediately arises whether this method can be fully relied on for all the types of disposable syringe that are offered to the medical profession. In a recent study[2] we have demonstrated that certain types of syringes cannot be sterilized with an adequate margin of safety, even under optimal conditions of gas sterilization. From the Figure and accompanying Table it will be readily seen which types of syringe are likely to fail in ethylene oxide sterilization.

The gross failure of type D and the marginal failure of type C syringes even at low levels of contamination can be attributed to the inability of the gas to penetrate across the contact points between plunger and barrel. Accordingly, little reliance can be placed on ethylene oxide sterilization of certain types of disposable syringes, particularly those with wide double or triple contact plungers as illustrated above.

While we do not suggest that *Cl. welchii* is likely to be found in the gas-inaccessible sites of disposable syringes, it would nevertheless seem proper to legislate against the acceptance of ethylene oxide sterilization for those of the type C or D design. These should be processed by ionizing radiation at a dose of 2.5 Mrad from a cobalt-60 source.

We entirely agree with your statement that certain types of injection should never be made into the gluteal region and that the danger can be lessened by injecting elsewhere. We hope that this message has not passed unnoticed by nurses and physicians who administer adrenaline or colloidal iron preparations by injection. When the buttock is used as a site for intramuscular injection of other preparations, particularly non-inhibitory agents such as gammaglobulin, extreme care must be taken to avoid the carriage of transient flora of bowel origin along the needle track. It must be recognized that there is no skin disinfectant which will destroy spores rapidly, so the operator must rely on their mechanical removal from the injection site. Such skin preparations as tincture of iodine or 0.5% chlorhexidine in 70% alcohol will effectively destroy vegetative contaminants



Failure of Ethylene Oxide in Sterilization of Disposable Syringes

Syringe Design	No. Syringes Sterile after Treatment. Spore Contamination Load (*B. subtilis* var. *niger*)						Ethylene Oxide Acceptability
	10^3		10^4		10^6		
	No.	%	No.	%	No.	%	
A Single contact plunger (high density polyethylene) ..	Not done	—	Not done	—	40/40	100	Acceptable
B Double contact plunger (thin edge rubber)	40/40	100	54/55	98	145/150	96·5	Acceptable
C Double contact plunger (thick edge rubber)	60/65	92·5	63/102	61·7	110/231	47·5	Unacceptable
D Triple contact plunger (thick edge rubber), glass barrel	6/25	24	Not done	—	1/15	6·7	Unacceptable

1,000 mg. ethylene oxide /l. for 12 hours at 30° C., relative humidity 38%. (After Rubbo and Gardner, 1968. Results for type D not previously reported.)

and assist the removal of any spores.—We are, etc.,

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JOAN F. GARDNER.
Department of Microbiology,
University of Melbourne,
Victoria, Australia.

REFERENCES

1 Rubbo, S. D., and Gardner, J. F., *A Review of Sterilization and Disinfection*, 1965. London.
2 Rubbo, S. D., and Gardner, J. F., *J. appl. Bact.*, 1968, **31**, in press.

SIR,—The advice of Drs. P. W. Harvey and G. C. Purnell (23 March, p. 744) that adrenaline should not be injected into the buttock because it lowers oxygen tension locally and so allows gas gangrene spores carried from the skin to germinate is sound. It has been recommended for several years.[1] The evidence should, as Professor L. P. Garrod (30 March, p. 836) pleads, convince everyone that the buttock is no place in which to inject adrenaline. But it is going too far, I think, to seek to condemn all intramuscular injections mainly for theoretical reasons. Mr. W. H. Beesley (13 April, p. 116) advocates the use of the thighs only, and most of his reasons are sound. But injections into the buttocks can be as safe as those into the thighs if they are properly given. They should not be into the part on which the patient sits, and some patients prefer them.

The real objection to using the buttock applies to injections of all substances, and is that for the nurse the buttock is regarded as the "cheek." The use of the upper and outer quadrant of this area, which is smaller than the buttock as anatomically defined, allows injections to be given dangerously near the sciatic nerve. Patients have complained of tingling down the leg after nurses' injections into the buttock. For this reason the surface marking on the buttock for an intramuscular injection is best chosen by what is sometimes called Winston Churchill's method. For a right-handed operator injecting into the right buttock, place the tip of the left index finger on the anterior superior iliac spine and the tip of the middle finger (abducted as in the "V for Victory" sign) just below the iliac crest. The injection site is then within the triangle formed by the fingers and the iliac crest.

I have seen wrist drop from deltoid injections and a very painful thigh from injection under the tight fascia lata, and so feel that injections (other than adrenaline) into the "meaty" buttock should, if properly placed, continue to be used.—I am, etc.,

Chase Farm Hospital, Enfield, Middx. C. ALLAN BIRCH.

REFERENCE

1 Birch, C. A., *Emergencies in Medical Practice*, 7th edition, 1963. Edinburgh and London.

SIR,—The subject of the best site for intramuscular injections is one which recurs periodically in your columns. Following a leading article in the *B.M.J.* (16 September 1961, p. 758) there was a valuable correspondence, from both injectors and those injected, favouring on the whole the vastus lateralis as the best site, which has again been advocated by Mr. W. H. Beesley (April 13, p. 116). This site, advocated by the late Professors Grey Turner and Lambert Rogers, is so much better, I believe, than the gluteal one that it should be the routine one taught and practised. Some years ago, following the observation of a series of cases showing hideous staining after too superficial injection of iron in the gluteal region, Messrs. Reckitt & Sons (40 Bedford Square, London W.C.1) prepared for me at this hospital a coloured film-strip for the instruction of nurses and others, showing a suitable technique for injections into the vastus lateralis, and this can be obtained from them.—I am, etc.,

BRYAN WILLIAMS.
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Teeside.

Medical Ethics

SIR,—Sir Roger Ormrod (6 April, p. 7) points out some of the difficult problems in ethics now arising as a result of new scientific developments and changes in legislation. He rightly indicates that the traditional code provides guidance to practitioners in a therapeutic relationship with patients but has never dealt adequately with problems outside this sphere, and that the concept of ethical obligations to the State has developed slowly. This is a field where problems other than financial control can arise. All States are not invariably right all the time, and a point may come at which the individual doctor may feel he must make a stand. He may, for instance, feel that the interests of humanity as a whole are endangered by anti-therapeutic activities, such as engaging in the preparation or practice of biological warfare, or he may feel that some action he is required to undertake transgresses the medical ethic in which he believes. The law, therefore, may not inevitably determine the limits within which ethical principles can operate.—I am, etc.,

NORMAN MACDONALD.
Clare Hall Hospital,
South Mimms, Herts.

SIR,—The article "Medical Ethics" (6 April, p. 7) is a model of clarification. It is not quite clear, however, to what extent Sir Roger Ormod himself approves of the circumstances which compel his conclusions. It must also be seriously questioned how far the profession could allow, particularly with regard to such matters as abortion, euthanasia, and transplantation, so clear-cut a distinction between "therapeutic" and "non-therapeutic" aspects within a doctor–patient relationship.

The article prompts two fundamental questions. In his summing up Sir Roger suggests that "the inevitable, logical result of contemporary thought which rejects traditional solutions" is that practitioner and patient at the difficult points must each be left to make his own *individual* decisions. But, if the guide-lines of the traditional codes are to be allowed to fall into abeyance, what will be left except solipsism, self-determination, and self-expression? The prevailing existentialist philosophy, accompanied by contemporary permissiveness, already overindulge the impulse, desire, and whim of the moment. What ethical guide will survive, and what becomes of future law-making? A second question concerns the likely state of the Western World after the completion of the "changing over from a community . . . based more or less firmly on what is called the Christian Ethic . . . to one based on humanist and sociological principles." Ethical decisions will presumably then be in the hands of the scientific humanist, especially the biologist and behavioural scientist? But, on their present showing, are they fit for the job?

We suggest that before it discards them the profession should take a very long and careful look at Geneva's revision of Hippocrates, the Ten Commandments, and Christ's Golden Rule. For, to put it quite bluntly, it is precisely in those countries which have had most time and opportunity to work out the principles of the scientific humanist that free speech and personal liberty are at their lowest. As Albert Einstein reminded us, it was not the liberal politician, press, or university, but "only the Church stood squarely across the path of Hitler's campaign for suppressing truth."[1] We submit that, rightly understood, the Christian faith is the staunch ally of all that is good in medical ethics, and for the nation as a whole it is the main source and buttress of intellectual freedom, personal liberty, and moral integrity.—We are, etc.,

London N.W.2. DAVID TRAPNELL.
Cheam, Surrey. DOUGLAS JOHNSON.

REFERENCE

1 Van Dusen, H. P., *What is the Church Doing?* 1943, p. 38. London.

Ethics and Abortion

SIR,—Your leading article (6 April, p. 3) seeks to set up for the medical fraternity an ethical directive which is basically untenable, and in order to do so has to descend to sophistries. It has already been decided for us what we may legally do and not do, and about this the B.M.A. has now nothing further to say. There is no suggestion that the legal termination of a pregnancy on social grounds would be professional malpractice. What remains will be a question which individual practitioners will have to decide for themselves on the merits of each individual case. It would be preposterous to suppose that any practitioner, acting conscientiously and legally, could come under the effects of any sanction imposed by his fellow doctors. Yet your leading article would seem to imply some such threat.

It is not open to the B.M.A. to attempt to intrude itself between a man and his conscience. You are confusing the issue when you write, "The essence of professional freedom for a doctor is his right to act in professional matters uninfluenced by any considerations other than the judgement of his fellows." The doctor's first duty is to his patient, and when he makes his decisions he must be guiding himself by his own standards, and not looking over his shoulder to see what the others will say. You write: "Medical ethics are the collective conscience of the profession." There is no such thing as a collective conscience, since all consciences are individual. You conclude with the statement that "a plea of 'superior orders' would be a sinister echo of something that ended 20 years ago at Nuremberg."