units of insulin daily. She attended regularly, usually well controlled, though during a cold in 1964 the blood sugar reached 290 mg./100 ml., with considerable ketosis. Chest x-rays in 1963 and 1964 were normal.

There were no further admissions until November 1967 at the age of 17. She then needed 36 units Soluble+36 units P.Z. insulin daily, and developed a precomatose state after an emotional crisis. She again had basal crepitations and, now, tenderness in the left hypo-chondrium. Later in the day a localized "rub" developed in the left 4th and 5th interspaces, thought at first to be pericardial friction. The blood sugar was 350 mg./100 ml., and there was considerable ketosis. X-ray again showed emphysema at the root of the neck on the right, and in a thin line outside the heart shadow. She made a good recovery, and, still fit, attends the clinic regularly.

The comments of Professor B. McNicholl and his colleagues (23 November, p. 493) are of particular interest. This girl developed a very marked degree of ketotic breathing on each occasion, but there was no cough or evidence of lung disease. Would it be fair to postulate, also, a constitutional weakness of the alveolar wall in these cases, particularly if the emphysema is liable to recur?—I am, etc.,

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Measuring Blood Sugar

SIR,—Dextrostix strips provide a useful and speedy method of differentiating between hypo-, normo-, and hyperglycaemia.¹ Opinions, however, are widely divergent as to their use in routine blood sugar estimations at diabetic clinics. Furthermore, the upper limit of reading of 200 mg./100 ml. would seem to be a severe limitation to their use.

In order to check the range of error of routine Dextrostix readings and to assess the possibility of obtaining estimations in the diabetic clinic above 200 mg./100 ml. without diluting the blood, the following experiment was performed. Samples of blood were taken by venepuncture so that subsequent laboratory readings could be obtained for comparison. (This was done by the Folin-Wu method which measures total blood sugar as opposed to blood glucose, and may be the same or higher than the Dextrostix reading.) Three Dextrostix were used, and the results read at 20, 30, and 60 seconds. Where the 60-second reading was under 200 mg./100 ml. this was compared with the laboratory result. However, where the result was 200 mg./100 ml. or over, the corresponding reading at 30 seconds multiplied by two was used for comparison, unless this also was 200 mg./100 ml. or over, in which case the result at 20 seconds was used multiplied by three.

In the direct readings under 200 mg./100 ml. there were 20 readings. Seventeen of these were within 30 mg./100 ml. of the laboratory results and all within 60 mg./100 ml. There were 17 readings in the 30-second $\times 2$ group—that is, direct readings 200 mg. to 320 mg.—of which 13 were within 30 mg./100 ml. and all within 60 mg./100 ml. Over 350 mg. (in the group read at 20-second $\times 3$) there were only five readings, four of which were within 30 mg./100 ml. and one 40 mg. higher than the laboratory estimation.

These numbers, although small, suggest a

sufficient degree of accuracy for use as a routine clinic measure, and that the use of two Dextrostix—one of which be read at 30 seconds, and the result multiplied by two—is justified when the blood sugar may be expected to be high.—I am, etc.,

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REFERENCE

- ¹ Mackay, N., Gordon, A., and Neilson, J. McE., *Lancet*, 1965, 2, 269.

Brescia-Cimino Shunts for Dialysis

SIR,—I read with interest the report by Dr. R. McMillan and Dr. D. B. Evans (28 September, p. 781) on their experiences with the arteriovenous fistula in intermittent haemodialysis, and the subsequent comments of Dr. J. S. Hanson and others in the correspondence columns (30 November, p. 577).

I would like to confirm all that Dr. Hanson and his colleagues have said, and draw attention to the fact that the majority of experienced physicians endeavouring to maintain patients on long-term haemodialysis are now acknowledging the fundamental contribu-

tion that Brescia and his colleagues¹ made when they described their original technique in the creation of the arteriovenous fistula for haemodialysis.

I feel it is extremely dangerous to draw conclusions of such far-reaching importance from a solitary measurement of cardiac output in one patient. While respecting the opinions of Dr. McMillan and Dr. Evans, I nevertheless feel that one must dismiss their contribution as typical of clinical empiricism unsubstantiated by objective evidence.

However, the most serious criticism I have to make relates to their statement—"In Cambridge, haemodialysis is undertaken only as a preoperative and postoperative maintenance for patients on the renal transplant programme." One must ask the authors what will happen to the patient whose arteriovenous fistula was surgically closed when his transplant fails and he requires further haemodialysis. Or are we to believe that at Cambridge renal cadaver transplantation has become a curative operation?—I am, etc.,

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REFERENCE

- ¹ Brescia, M. J., Cimino, J. E., Appel, K., and Hurwicz, B. J., *New Engl. J. Med.*, 1966, 275, 1089.

Uses of Blood Gas Estimations

SIR,—Last winter 69 patients with chronic respiratory disease (mostly obstructive, but two restrictive) entered my general wards with acute exacerbations, and I was able to examine 236 arterialised ear-blood samples taken from 62 of them, using the Eschweiler analyser.

Results were immediately useful in recognizing the presence and degree of decompensated respiratory failure, which proved unexpectedly common (Table I); distinguishing hypercapnoeic from other comas; distinguishing underventilation, with its special problems, from simple hypoxaemia (Table I); prognosis (Table II); and, occasionally,

calculating bicarbonate dosage in gaseous acidosis.

In this series the critical value for oxygen proved to be 50 mm. Hg, that for carbon dioxide 57 mm. Hg. Subsequent definite rise in either figure modified the original prognosis; but sharp substantial change was unusual except during oxygen therapy. Gross hypoxaemia was so closely associated with serious carbon dioxide retention that their effects are difficult to separate.

The apparently increased mortality in patients treated with oxygen was due mainly to "worst case selection," but not so the difference between 28% Ventimask (9 deaths in 15 cases) and 24% Ventimask (3 deaths in 8 cases). A policy change of concentration was made in February. The effect of oxygen in either concentration was capricious. The rise in arterial oxygen tension averaged 50% of that in the inspired gas, but varied in individuals from less than zero to 100%. The carbon dioxide tension rose substantially (11 to 35 mm. Hg) in six cases, moderately

TABLE I.—Results: Classification of Patients by Blood Gas Analysis

	No. of Cases
Within normal limits	1
Hypoxaemia with normal P_{aCO_2} (< 40 mm. Hg)	12
Borderline underventilation + hypoxia	3
Underventilation (hypercapnoea) (> 45 mm. Hg)	4
+ hypoxaemia	46
Total	62

TABLE II.—Prognosis and Blood Gas Levels

Level First Recorded	Subsequent Course	No. of Cases	Deaths	Mortality
$O_2 > 50$ mm. Hg		25	2	8%
$O_2 < 50$ mm. Hg	No O_2 therapy: rise to > 50 mm. Hg	6	1	28%
	Metered O_2 : rise to > 50 mm. Hg*	12	4	
	No O_2 therapy: rise to < 50 mm. Hg	9	3	54%
$CO_2 > 57$ mm. Hg	Metered O_2 : rise to < 50 mm. Hg†	7	6	
	Metered O_2 : no record: early death	3	3	
CO_2 46–57 mm. Hg	Later rising to 57 or higher	5	2	21%
46–57 mm. Hg	Remaining below 57 mm. Hg	9	1	
40–45 mm. Hg	Later rising to 57 or higher	1	1	11%
	Remaining below 57 mm. Hg	8	0	
< 40 mm. Hg	None rose above 48 mm. Hg	16	2	12½%
	Totals	62	19	31%

* Mean rise 26 mm. Hg in P_{aO_2} . † Mean rise 3 mm. Hg in P_{aO_2} .

(2 to 9 mm. Hg) in eight cases, was unchanged in three, and fell slightly in one case. Sharp rises culminated twice in death and once in deep coma. In six patients the level appeared to stabilize at plateau levels of 60, 70, or 75 mm. Hg, and this proved a relatively benign phenomenon, for five of them survived to show a prompt fall when oxygen was stopped. The carbon dioxide rise bore little relation to the initial level. The two patients who died in acute hypercapnoea following 28% oxygen had original levels of only 45 and 47.5 mm. Hg respectively. Another patient's carbon dioxide rose from 40 to 47 mm. Hg on metered oxygen.

Attempts to forecast these effects were made in 19 cases, but failed. Blood gases estimated just before, and repeated after 10 minutes on, 28% oxygen showed an average about half of the ultimate oxygen rise (that is, 25% of the increase in inspired oxygen tension), but with great individual variations; virtually none of the carbon dioxide rise was at this stage demonstrable. After 24 hours, effects were usually clear, but by then the good or harm had been done.

The effects of intramuscular cropropamide were monitored in 10 cases. Two patients achieved oxygen rise with fall in carbon dioxide, both effects exceeding 10 mm. Hg. The others, despite clinical improvement, showed no definite change in blood gases. The unreliability of this treatment is disappointing, for a moderate oxygen rise is far more valuable if the carbon dioxide falls. Voluntary overbreathing improved both blood gases, but the effect was transient. Recovery clinically was sometimes surprisingly good, but the blood gases seldom became normal. Exercise tests demonstrated that many chronically underventilated patients increase ventilation on exercise, but small variable changes, often within limits of random error, were difficult to interpret.

It is easy to demonstrate serious hypoxaemia or underventilation; but clearly, at critical levels, small differences are prognostically important. Comparison of successive readings requires less absolute accuracy, but even greater consistency is needed. In both situations, differences of 10 mm. Hg have been found important, and 5 mm. Hg differences significant; provided technical error can be excluded. This means working closely to the best possible technical standards.¹ Fortunately, when in doubt, ear lobe samples are easily repeated.—I am, etc.,

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REFERENCE

- ¹ Flenley, D. C., Millar, J. S., and Rees, H. A., *Brit. med. J.*, 1967, 2, 349.

Intermittent Claudication

SIR,—Your article in the *Medicine Today* series (7 December, p. 630) on intermittent claudication makes no mention of the prognostic and therapeutic value of paravertebral lumbar sympathectomy.

I work in a pain clinic which has over the past twenty years injected many patients suffering from intermittent claudication. Repeated paravertebral injections with local anaesthetic will sometimes result in a three-fold increase in exercise tolerance. Most of these patients are referred back to the surgeon

for lumbar sympathectomy. Patients unsuitable for surgery have either a series of injections, or a chemical sympathectomy.

Chemical sympathectomy using up to 15 ml. of 6% aqueous phenol will make some patients free from pain for many months.—I am, etc.,

M. D. CHURCHER.

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Postoperative Anaesthesia of the Chin

SIR,—A small number of patients who have undergone oral surgical operations under general anaesthesia complain post-operatively of numbness over the lower central area of the chin and the upper anterior part of the neck. The affected region involves a narrow strip of skin extending for about 1 in. (2.5 cm.) on either side of the midline, but, though the mental nerve territory is overlapped, neither anaesthesia nor paraesthesia of the lower lip is present. The disability is of short duration, and recovery usually occurs within two to three weeks. It is obvious from the local cutaneous distribution that the complication cannot be attributed to impairment of sensory function in the mental nerves, and the probable cause is a neuropraxia of the upper branch (C.2) of the anterior cutaneous nerve of the neck. It is inconceivable that interruption of the main trunk of this nerve occurs, otherwise the diminution or loss in sensation would encompass a very elongated area reaching as far inferiorly as the sternal notch.

The theory that the numbness might result from fingertip pressure over the implicated cutaneous nerve can be discounted in the cases seen. This complication is probably caused by excessive, and prolonged extension of the patient's neck in an attempt by the anaesthetist to facilitate or improve surgical access to the palate. While it lasts the sensory disturbance seems to cause little inconvenience to the affected person, but it would seem reasonable to avoid undue neck extension in the elderly and in individuals known to have cervical spondylosis.—We are, etc.,

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Solvents for Ear Wax

SIR,—I wish to take issue with Dr. J. I. Horowitz on the subject matter of his letter (30 November, p. 583). The results of a controlled clinical trial shortly to be published on my behalf show that in clinical practice Xerumenex ear drops fulfil all the modest claims made by the manufacturers. Initially, my *in vitro* experiments showed that recently removed cerumen was liquefied by Xerumenex overnight. This *in vitro* activity was fully substantiated in the controlled clinical trial which followed. In this trial 24 patients had the ceruminolytic instilled in their ears, and 21 acted as controls. Each patient was then required to remove their excessive cerumen with self-syringing of water from a rat-tailed 2 oz. (57 ml.) rubber syringe, a procedure

which was unpractised and unfamiliar to all of them. The results are shown in the Table.

Treatment	Water Syringing and Xerumenex	Water Syringing alone
Number of patients from whom cerumen was completely cleared ..	18	1
Number of patients from whom cerumen was not cleared or only partially cleared	6	20
Totals	24	21

In the words of the clinical investigator "the difference is highly significant" ($P < 0.005$). I noticed that two of the ear-drops mentioned contained exactly the same active agent—namely, dioctyl sodium sulphosuccinate—but had widely varying *in vitro* activities. Was the cerumen not of a homogeneous nature? It would seem necessary to emphasize the necessity for controlled clinical evaluations to determine the effectiveness of any human therapy. Nevertheless, I would agree with Dr. Horowitz that olive oil and other oily preparations are useless. Further, they have no sound pharmacobiochemical basis of activity to support their usage.—I am, etc.,

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Northern Ireland.

Examination Methods

SIR,—In your report on the Royal College of General Practitioners' Conference on Examination Methods (23 November, p. 510) I have been slightly misquoted. It is true that I did say in effect that the only satisfactory forms of multiple-choice question are those in which a single correct answer is chosen from two or more possible answers. Taken out of context, however, as in your report, this reads like a sweeping criticism of the type of question introduced originally into Part I of the London M.R.C.P. examination,¹ in which the number of right answers is not specified. I would like to make it clear that I said at the conference, and still say, that the current popularity of this question form is well deserved, for it has considerable virtues, though, of course, the older one-from-five question has also some advantages—one may need to use both. My criticisms of the M.R.C.P.-type question relate only to the method of marking originally used, which is unnecessarily complicated and logically defective²⁻⁴; these criticisms can readily be answered either by treating each question as a group of true-false questions,² which the candidate can leave blank if he does not know the answer, or (less completely but still adequately) by the Middlesex group's method.³ In any case, the current system, despite its defects, works well enough in practice—I am, etc.,

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REFERENCES

- ¹ Owen, S. G., Robson, M. G., Sanderson, P. H., Smart, G. A., and Stokes, J. F., *Lancet*, 1967, 2, 1034.
² Lennox, B., *Brit. J. med. Educ.*, 1967, 1, 203.
³ Harris, P. T. C., and Buckley-Sharp, M. D., *Lancet*, 1968, 1, 980.
⁴ Husak, T., *Lancet*, 1968, 1, 859.