into the throat. The central groove in the tongue blades suitable for children accommodates half the circumference of the endotracheal tube, whereas in the larger blades the groove accommodates only one-third of the circumference. The tongue blades are manufactured in five different sizes corresponding to the measurements described in the instrument catalogue of Messrs Down Brothers.

The tube clamp is a thin, curved plate of approximately half the length of the blade, with a knob on its palatal surface to facilitate handling. This clamp prevents arching of the endotracheal tube, thereby providing improved surgical access. The apparatus does not produce a reduction in the internal diameter of the endotracheal tube, but in adults it may be necessary to open the gag fully, causing a kink of the endotracheal tube at its exit from the gag frame (fig. 2). To prevent this, we use a wider gag with limbs about 9 cm apart.

This modified tongue blade is useful for adeno-tonsillectomy and palatal repair.

FIG. 2. Extent of kinking of the endotracheal tube when the gag is opened to the maximum.

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FIBROPTIC BRONCHOSCOPY

Sir,—Dr F. I. Macnaughton's (1975) paper was both interesting and informative as to the difficulties involved in fibreoptic bronchoscopy under general anesthesia in patients receiving positive pressure ventilation.

We have developed a low-resistance tube and endotracheal tube adaptor for use during fibreoptic bronchoscopy (Carden and Raj, 1975). The design is such that it resembles an adult version of the Cole endotracheal tube originally made for infants, being 11 mm in cross-section at the proximal end and 8.0, 8.5 or 9.0 mm at the distal end, which is inserted through the patient’s cords. The tube is made of silicone and has a low-pressure silicone cuff. On the top of this tube is an adaptor with a diaphragm to allow the bronchoscope to be inserted through it with minimal friction but maximum sealing. When the bronchoscope is not in use, a plug is provided to fit into this diaphragm. This tube would seem to be the most suitable for use during fibreoptic bronchoscopy, particularly in women. The tube, which was developed in the United States of America, is now available in the United Kingdom from Cory Brothers, 4 Dollis Park, London N3.

EDWARD CARDEN
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REFERENCES


AN EXPIRED GAS COLLECTION AND DISPOSAL SYSTEM

Sir,—As the inventor of the Ejector Flowmeter (Jergensen, 1974), it pleases me to see that the necessity for a volume control on the discharge of overspill anaesthetic gas is now acknowledged by several authorities. The method described by Parbrook and Monk (1975) for the evacuation of overspill gas is the same as that used by the Dupaco Corporation (Whitcher et al., 1975). A flowmeter which shows the total evacuation of anaesthetic gas plus room air through a central suction system, or an electric pump in the theatre, is employed in both of these systems.

Parbrook and Monk mention the disadvantages of using an Ejector Flowmeter to be its bulk, the risk of explosion, the noise, the risk of leakage and the high cost. These are by no means in agreement with the facts.

In the Ejector Flowmeter, the driving gas passes across the upper end of a flowmeter tube calibrated for up to 15 litre of air per minute. An ejector suction unit is incorporated in the upper frame of the flowmeter box. Apart from a shut-off valve on this upper frame, the Ejector Flowmeter has the same appearance as all other flowmeters, and has the same bulk. I understand that the device described by Parbrook and Monk includes also a flowmeter, presumably of the same size, and attached to (the rail of ?) the anaesthetic trolley.

A compressed-air pipeline is installed in most operating theatres and may be used in many ways, such as to drive an Ejector Flowmeter. Parbrook and Monk are in error in presuming that oxygen is used; of course it can be used, but that would increase the running costs. This would not
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incure any risk of explosion, as conductive material has been employed in the manufacture, and the inside of the flowmeter tube has an antistatic covering.

The Ejector Flowmeter is not noisy as stated. The explanation is simple: a consumption of 3 litre of driving gas per minute can remove 10 litre of gas through the flowmeter, and this is sufficient in all respiratory circuits. A total gas flow of 12–15 litre through the instrument produces no noise at all. The necessary driving gas pressure is about 1 atm and may be increased if desired.

The tubing which removes gas through the Ejector Flowmeter from the anaesthetic circuit or from a collection reservoir, namely a standard breathing bag with a maintained ambient pressure, has the same calibre as a ball-point pen, as has the disposal tubing. Gas is easily removed from any anaesthetic circuit without any added bulk. The design by Parbrook and Monk requires a standard corrugated tubing for gas disposal.

The Reciprotor pump needs an electric power supply for its function, and involves a risk of explosion and the need for maintenance. The pump must be insulated against noise and, in addition, is sited in a remote part of the theatre to combat this inconvenience. Thus, noise is still a problem and the pump must be placed as far away from the place of work as possible. Further, the pump must be removed when the theatre is cleaned. The Ejector Flowmeter with its disposal tubing is a permanent fixture on the anaesthetic trolley and needs no cleaning.

Parbrook and Monk recommend low pressure in the disposal tubing carrying anaesthetic gas and evacuated room air to the Reciprotor pump, to prevent spillage into the theatre in the presence of leaks. With an evacuation rate of 10 litre/min, the pressure at the outlet of the Ejector Flowmeter upstream of a disposal tubing 4 m long is about 25 and 12 cm H2O at driving gas pressures of 3 and 1 atm, respectively. The same pressure is obtained in an anaesthetic circuit during controlled respiration. It is simple, indeed, to maintain standard pressure tubing of this length free from leaks and to connect it to a pendant adjacent to that pendant serving the anaesthetic trolley.

The objections concerning bulk, noise, risk of explosion, running costs and risk of leaks during the use of the Ejector Flowmeter are therefore irrelevant. It has been employed in Denmark for more than 100,000 anaesthetics without any complaints. Further descriptions of the application of this instrument will appear in the near future (Thomsen and Jorgensen, 1976a, b; Christensen, 1976).

Søren Jørgensen
Odense, Denmark


Sir,—Thank you for allowing us to see the letter from Dr Jørgensen. Our comments were not specific criticisms of Dr Jørgensen's Ejector Flowmeter but were general comments regarding flow-inducing systems placed on the anaesthetic trolley. The comments regarding bulk in particular are more relevant to the use of a pump as a flow inducer than to the use of a small venturi device with a water-trap bottle.

Contrary to Dr Jørgensen's implication, we do not recommend a volume control in the scavenging system although we do recommend an indication (for example, by rotameter) that the extract rate is adequate, having pre-arranged that the extract rate is well above the minimum requirements. We did not discuss the alternative system described by Dr Jørgensen in which the rate of extraction is adjusted to meet the requirements as shown by the size of a scavenging reservoir bag. It appeared to us that it was inconvenient to observe such a reservoir continuously and that this system would require emergency inspiratory and expiratory valves in case the anaesthetist's attention was distracted.

Dr Jørgensen is also mistaken in suggesting that we recommend a low pressure in disposal tubing. We claimed that the risk of leakage from this tubing or its junctions was greater if there was a positive pressure.

As mentioned in our paper, we agree with Dr Jørgensen that if an electric pump is used it should be placed at a central location, such as the plant room outside the theatre. Only our earliest model was in the theatre and this was for the convenience of the prototype trial. Whether the noise from a venturi, in the theatre, is acceptable will depend upon the type of venturi and the tolerance of one's surgical colleagues.

In Denmark, where compressed air is available freely, the question of the cost of oxygen to drive a venturi does not arise. In the U.K., however, piped compressed air is rarely available. Anaesthetic techniques still vary considerably in different countries and local practice will need to be considered by anyone thinking of the installation of a scavenging system.

Geoffrey D. Parbrook
Ian B. Monk
Glasgow

REFERENCES


ABSENCE OF SUXAMETHONIUM FASCICULATIONS IN PATIENTS WITH ATYPICAL PLASMA CHOLINESTERASE

Sir,—I have been following with interest the correspondence on the subject of the absence of muscle fasciculations in patients with atypical cholinesterase (Baraka, 1975; Hunter, 1975). In theory, Dr Baraka may be correct in his assertion that fasciculations should not occur following the injection of suxamethonium into patients with atypical plasma cholinesterase. This may result either from an overwhelming effect at the postsynaptic site, preventing