and Bain systems in anaesthetized spontaneously breathing adults. Can Anaesth Soc J 1986; 33: 698–709.
2 *Humphrey D, Brock-Utne JG, Downing JW.* Single lever Humphrey A.D.E. low flow universal anaesthetic breathing system: Part II: Comparison with Bain system in anaesthetized adults during controlled ventilation. Can Anaesth Soc J 1986; 33: 710–8.
3 *Humphrey D.* A new anaesthetic breathing system combining Mapleson A, D and E principles: a simple apparatus for low flow universal use without carbon dioxide absorption. Anaesthesia 1983; 38: 361–72.
4 *Humphrey D.* A new coaxial breathing system. Anaesthesia 1985; 40: 1136–7.
5 *Conway CM.* Anaesthetic breathing systems. Br J Anaesth 1985; 57: 649–57.
6 *Furst B, Laffey DA.* An alternative test for the Lack system. Anaesthesia 1984; 39: 834.
7 *Martin LVH, McKeown DW.* An alternative test for the Lack system. Anaesthesia 1985; 40: 80–1.
8 *Snowdon SL.* Coaxial breathing circuit. Anaesthesia 1983; 38: 387.
9 *Nunn JF.* Potential economics of using closed circuit anesthesia. *In*: Low Flow and Closed System Anesthesia. Aldrete JA, Lowe HJ, Virtue RW (Eds). Grune & Stratton, New York 1979; 109–12.
10 *Humphrey D, Brock-Utne JG.* Lightweight, economical and pollution-free paediatric breathing systems; a new approach. Acta Anaesthesiol Scand 1985; Suppl 80; 29: 65.
11 *Dennison PH.* Coaxial tubing for conventional anaesthetic system. Anaesthesia 1984; 39: 841.

Para-tracheal Audible Respiratory Monitor (PTARM)

To the Editor:

The use of a precordial or oesophageal stethoscope to monitor breath sounds during anaesthesia is an established method for detecting failure of ventilation due to any cause. However, the need for the anaesthetist to be connected to the stethoscope tubing can interfere with the performance of other anaesthetic duties.

We have found the Para-Tracheal Audible Respiratory Monitor (PTARM) to be more informative than precordial or oesophageal stethoscopes in the early detection of respiratory obstruction or depression. PTARM is especially valuable in the CT scan room, the intraoperative irradiation room or any other location where the anaesthetist is of necessity forced to remain at some distance from the patient. It can also be used to monitor the patient's breathing in the Recovery Room. This device frees the anaesthetist from the earpiece and connecting tubing that limit movements about the patient. It also allows all anaesthesia personnel in the room to monitor the patient's breath sounds simultaneously.

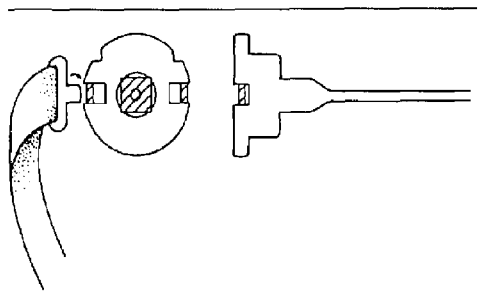

FIGURE Lateral (right) and frontal (left) view of microphone and its holder.

The PTARM is comprised of a condenser microphone (Sony, Japan, Model 0604), plus a preamplifier, an audio-amplifier and a loudspeaker. The preamplifier and audio-amplifier are both included in a consumer's audio-kit (Decad Electronics, Tel Aviv, Israel) which uses a 2N5089 transistor and a TDA 2003C audio-amplifier chip (Fairchild Camera & Instrument, Mountain View, California)). We have used a three-inch loudspeaker.

The holder and the flexible band (Figure) were designed for convenience of use when applied for long durations.

The PTARM can be used as a respiratory monitor in any anaesthetized patient breathing spontaneously or ventilated through an endotracheal tube. The broadcast of the audible sounds of air movement allows the anaesthetist to continuously monitor ventilation, without the disadvantage of the physical restrictions imposed by precordial or oesophageal stethoscopes.

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Anaesthesia for Treacher Collins Syndrome

To the Editor:

I read with interest the article "Anaesthesia for Treacher Collins and Pierre Robin Syndromes: a report of three cases" by Rasch *et al.*[1] I have had extensive experience

in anaesthetising children and young adults with the Treacher Collins Syndrome who presented for evaluation of their external ears and hearing and for corrective surgery on their eyes and ears. Because awake intubation requires a balance between sedation and cooperation of the patient, it is extremely difficult to use this technique in children over the age of six months and under the age of eight. Even in the older age groups those who have had bad experiences refuse to cooperate in this technique.

I have found that these children may be safely anaesthetized with halothane, using a mask induction technique. Once the patients are in a deep plane of anaesthesia, I spray the posterior part of their tongue and their pharyngeal structures and, if visualized, the epiglottis, with four per cent lidocaine. Once these structures have been anaesthetized, the children will not have airway difficulties or laryngospasm in the lighter planes of anaesthesia. With the child breathing spontaneously a laryngoscope is placed, exposing the glottic structures. The endotracheal tube is then advanced by using the breath sounds through the tube as a guide. As long as the breath sounds are continuous and loud through the endotracheal tube, the tube is advanced until it is passed through the glottis. I have used this technique many times, without difficulty. I write this as an agreement with the suggestions brought forth in the article by the authors and add another word from experience with children who have the Treacher Collins Syndrome. The anaesthetic manoeuvre and procedure has proven to be satisfactory.

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REFERENCE

1 *Rasch DK, Browder F, Ball M, Greer D.* Anaesthesia for Treacher Collins and Pierre Robin Syndromes: a report of three cases. Can Anaesth Soc J 1986; 33: 364–70.

REPLY

I would agree that inhalational induction may be an option for anaesthetizing these patients under certain conditions. Some criteria for use of this technique might be: (1) patients previously anaesthetized by yourself or an associate who were not difficult to ventilate by bag and mask, and in whom no operative procedure had been done in the interim that might change airway anatomy (e.g., cleft palate repair, pharyngeal flap, etc.), (2) patients without evidence of cor pulmonale or other obstructive symptoms in the unanaesthetized state, and (3) patients in whom an "awake look" has been done, revealing adequate exposure of the glottic structure.

In addition, our discussion was directed toward anaesthetists who have little or no experience in dealing with this group of patients, so our recommendations were somewhat conservative. Nonetheless, even healthy children with normal airway anatomy can suddenly become upset during the induction of anaesthesia and with crying, develop copious secretions and laryngospasm. If ventilation by bag and mask or intubation of the trachea are unsuccessful, the child may be committed to transtracheal puncture for jet ventilation, or tracheostomy.

In regard to topical anaesthesia of the airway, unless the lidocaine spray is placed on the cords or below (as in transtracheal instillation) motor innervation to the vocal cords are not blocked, and, therefore, one cannot guarantee that laryngospasm will not occur during airway manipulation or light anaesthesia.[1] Topical anaesthesia at the level of epiglottis and above will block sensory innervation only. Another option in the awake child is to nebulize 4 mg·kg^{-1} of lidocaine in saline. This will often effectively anaesthetize the entire airway down to the level of the vocal cords. With judicious sedation, which I admit is time-consuming and sometimes difficult to judge, one can often get valuable information about the airway with an awake look. There will always be the case, as implied by Dr. Mayhew, where visualization of the vocal cords and glottic structures will be impossible and breath sounds via the endotracheal tube will be necessary to guide proper placement of an artificial airway.

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REFERENCE

1 *Cousins MJ, Bridenbaugh PO.* Neural Blockade. *In:* Clinical Anesthesia and Management of Pain. J Lippincott Company, Philadelphia, 1980.

Combined subarachnoid and epidural block for Caesarean Section

To the Editor:

With reference to the letter by Rawal describing single segment combined subarachnoid and epidural block (CSE) for Caesarean section[1] I would like to report my own experience using a similar technique. I use the CSE technique described by Nickalls and Dennison[2] where the epidural space is identified using a Tuohy needle through which the spinal is performed with a spinal needle (26 gauge, 150 mm long) held in place by an artery forceps. Puncture of the dura is very distinct, but flow of cerebrospinal fluid is not always seen. The dose requirement of 0.5 per cent bupivacaine is 1.5 to 1.6 ml, depending on the height of the patient.[3] The extent of the block at the end of 15 minutes is usually T_4 and good surgical anaesthesia has been produced invariably. Rarely an additional injection of the epidural drug has been required to extend the level of block.

Once the baby is delivered an injection of 8 ml of 0.25