High frequency ventilation (HFV) techniques are nowadays more and more used in experimental and clinical set-ups and several devices for HFV have become available. Some are claimed to give a volume controlled ventilation, without air entrainment and others are seemingly functioning as a jet injector, inducing admission of a certain amount of ambient air to the injected gas mixture. It is self evident that the oxygenation of the patient can greatly be influenced by the amount of air entrained. Furthermore the measurement of endtidal CO₂ by sampling at the end of the endotracheal tube during HFV does not reflect the PaCO₂ value and the efficiency of alveolar ventilation anymore.

To gain better insight in the dynamics of gas exchange during HFV, the present study was undertaken.

TECHNIQUES
A Centronic® massspectrometer, specially adapted for anaesthetic gases, was used as it permitted simultaneous measurement and recording of up to 8 gases. O₂, N₂, Argon, CO₂ and when appropriate N₂O concentrations were analysed. A long small bored catheter was used, permitting gas sampling at the lower part of the trachea. This flexible catheter was fixed at the outer wall of the endotracheal tube, the terminal end being distal from the tube tip or was slided through the tube. In some cases an endotracheal tube was used with a built-in sampling line. When no endotracheal tube was in
place, but instead a naso-tracheal insufflation catheter, the sampling catheter was again fixed to this one, the tip ending distally.

For sake of convenience, measurements were made on patients anaesthetised by i.v. techniques. In some patients arterial blood was sampled for bloodgas measurements permitting the analysis of the efficacy of HFV.

The effects of ventilatory patterns were studied with: 1) an AGA BRONCHOVENT\textsuperscript{R} at a fixed standard frequency of 60/min. and at an inspiratory time of 22 % and 2) an ACUTRONIC\textsuperscript{R} MK 800, at various frequencies. Hundred % O\textsubscript{2} was always used as injecting gas, permitting easy recognition of any air entrainment (N\textsubscript{2} measurement).

Fig. 1. N\textsubscript{2} washout, after connection of Bronchovent via naso-tracheal catheter to the patient (at the extreme left sampling of ambient air).