This Supplementary Issue of the Journal contains an account of papers presented at the Second International Workshop on High Frequency Ventilation held at the University of Munster on February 16-17, 1989. The symposium was organized by Professor P. P. Lunkenheimer and was sponsored by COMAC-BME. We are grateful also to the Commission of the European Communities Director General in Brussels for sponsoring the cost of production and distribution of this supplement to the readers of the Journal.

The papers presented at the symposium were allocated to four major sessions: Basic Mechanisms—physiology and morphology; Measurement—airway mechanics and monitoring; Exciting systems; and Indications and side-effects. However, for the purposes of publication and to help understanding by the wider readership of this Journal, we have grouped manuscripts under three headings: Reviews, Original Articles and Abstracts. The first two categories are self-explanatory, whereas the section entitled Abstracts contains accounts of work in progress, or work submitted in full for consideration of publication elsewhere.

The subject of High Frequency Ventilation is confusing to the non-expert as there are still no accepted definitions of terminology. Traditionally, high frequency ventilation has been classified into High Frequency Positive Pressure Ventilation (HFPPV), where the lungs are ventilated at a frequency of 60-120 b.p.m. (1-2 Hz), High Frequency Jet Ventilation (HFJV) with frequencies of 120-300 b.p.m. (2-5 Hz) and High Frequency Forced Diffusion or Oscillatory Ventilation (HFOV), where ventilatory frequencies of the order of 300-3000 b.p.m. are utilized (5-50 Hz). However, these definitions pertain in essence to the apparatus used for performing High Frequency Ventilation. In physiological terms, the dividing line between conventional physiological mechanisms of achieving gas exchange and other mechanisms is not so well defined. In general, gas exchange with frequencies of ventilation up to 2 or 3 Hz (and possibly even up to 7 Hz) may be explained by conventional physiology. Above this frequency range, there is a transition from conventional bulk flow to complex aerodynamic and frequency dependent mechanisms of gas exchange. What makes the situation even more complex is that the stage of transition may vary according to the degree of pathological changes in the lungs. It will be clear from the paper on High Frequency Ventilation and Regional Compliance by Dr Lunkenheimer and colleagues that these workers have taken a frequency of 7 Hz as the dividing point between conventional mechanical ventilation and high frequency ventilation. Unfortunately, this definition is not accepted universally, as the authors admit, and the current definition of HFV is still a ventilation frequency exceeding 80 b.p.m.

Currently, commercially available systems of high frequency ventilation seem to be confined largely to jet ventilation, using a frequency range that embraces conventional mechanical ventilation to varying degrees. In the laboratory, many different types of apparatus have been developed and are described in this Symposium. It is fascinating, particularly for the more mature reader, to see a return of the cuirass ventilator and the body box. Another incidental novelty is the ability to use negative pressure in the expiratory phase (to minimize the mean intrathoracic pressure) because the duration of the phase is too short to allow the airways to collapse during expiration.

It will be clear that the role of high frequency ventilation in clinical practice is still not yet clearly defined. Undoubtedly, high frequency jet ventilation is an extremely useful technique which has found a definite role in some specialized areas, particularly during laryngeal surgery. However, it will also be clear from the following reviews that
high frequency oscillation has a less certain role. The recently conducted NIH study failed to demonstrate any benefit of HFOV in infant respiratory distress syndrome, but this was probably as a result of poor experimental design, data analysis, or both, as noted by several of our contributors. Undoubtedly, beneficial effects in the laboratory have been obtained by HFOV compared with conventional mechanical ventilation and a strong plea was made at the workshop for a well-designed and correctly executed study in Europe of the role of HFOV in respiratory distress syndrome.

Although some of the papers contained in this issue require a greater knowledge of mathematics than the average reader may possess, nonetheless by omitting the calculations, there is sufficient of interest in all the papers to attract the attention of all anaesthetists and others involved in mechanical ventilation of the lungs.

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