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Below are short overviews of the articles that appeared in this issue of VOLUME:

Evaluation of the KTK "Oxyquick" Apparatus (AJ Crockett, D Schembri and G Henderson)

This short article was written very soon after the introduction of domiciliary oxygen concentrators to Australia. At this time there was little local knowledge of the short and long-term mechanical reliability of oxygen concentrators and there was debate as to whether a back-up oxygen supply should be provided in the event of mechanical failure or power blackout.

The article describes the evaluation of a portable chemical kit ("Oxyquick") for producing oxygen in a clinical emergency. The kit contained 400 grams of sodium carbonate peroxyhydrate (active ingredient containing 14% w/w oxygen), 5 grams of manganic oxide (catalyst) and a 2 L plastic tank. When water is added to these chemicals, oxygen is produced. The authors reported that the Oxyquick kit produced almost pure oxygen (99%) for 30 minutes at a flow of 1.5 L/min. These preliminary data suggested that the kit may be a suitable as a source of emergency oxygen should the domiciliary supply such as an oxygen concentrator fail. In 1983 the Oxyquick apparatus cost $350.

You will notice that the first two authors are past Presidents of our Society (Alan Crockett and David Schembri). I spoke to Alan Crockett last month and he informed me that, to his knowledge, the "Oxyquick" apparatus was never used by patients in Australia. (I wonder whether it was (or is currently) used in field hospitals by the military.) Alan also provided an interesting anecdote. He was the person responsible for introducing the first oxygen concentrator to Australia! Whilst visiting the USA he was shown an oxygen concentrator manufactured by Mountain Medical (Denver) and was so impressed by the technology and its potential advantages over oxygen cylinders (eg lower cost, continuous oxygen supply, no bulky cylinder deliveries) that he brought an oxygen concentrator back to Australia as excess luggage! Since then he has played a central role in domiciliary oxygen therapy in Australia and is regarded as a leader in the field.

Evaluation of a Precision Gas Mixture (David P. Johns)

This article describes the evaluation of the '192 Precision Gas Mixer' developed by Corning Medical and Scientific. This device was designed to produce a continuous flow of any desired mixture of CO_2, O_2 and N_2. The manufacture claimed that the device produced accurately known concentrations of CO_2 and O_2 suitable for the calibration of blood gas analysers. It was designed to replace the expensive and bulky certified gas cylinders and to increase the range of gas mixtures available at any given time.

The operating principle was quantitative gas dilution. The quantity (or concentration) of each pure gas (CO_2, O_2, N_2) in the final mixture was controlled by a microprocessor that regulated the relative opening times of three solenoid valves (one for each component gas) according to the mixture dialled-up on the device's front panel. A disadvantage was that the output flow from the mixer was low and pulsatile.

This study showed that the device produced gas mixtures with an accuracy of at least 0.09% for CO_2 and 0.06% for O_2. It was concluded that the mixer was suitable for the production of gases for tonometering blood to check the performance of blood gas analysers and that with the additional provision of a mixing chamber it would also be suitable for the calibration of physical gas analysers which require flows of less than 60 ml/min. The author also speculated that it could be modified to provide accurate mixtures for calibrating other physical analysers (eg infra-red, paramagnetic) with sampling flows much higher than this. This would require the addition of a compliant chamber to smooth out the pulsatile flow and an increase in output flow. The great advantage is the ability to manufacture your own accurate gas mixtures of almost any composition at will and at relatively little cost.

Development of Body Plethysmography: Part 2: the measurement of airway resistance (Hennig Imberger)

This detailed article was written by one of the Society's founding members and prior to his retirement one of the Society's staunchest supporters. Hennig's qualifications in electrical engineering, instrumentation, mathematics and physiology and his PhD research (Whole Body Plethysmography and Respiratory Function, Melbourne University) are reflected in this authorative article.

The article discusses the measurement of airway resistance and is well worth reading even after 22 years! It is packed with information covering:

- Principles of the Method.
- Development of the Method (eg measurement of alveolar pressure, the first clinical plethysmograph (Dubois *et al*), respiratory volume correction, work of breathing, detection of ventilatory inhomogeneity).
- Present Methods of Solving the Practical Difficulties of Plethysmography (eg effect of temperature, humidity and box compliance, on the measurement of ΔV (change in lung volume during panting), presence of ventilatory inhomogeneity).

Contact me (details below) if you would like a copy of this article.

Hennig's theoretical understanding of respiratory physiology, instrumentation and programming, and his 'uncanny' ability to logically solve complex problems was outstanding as was his mentorship from which many of us 'oldies' benefited. Whenever Hennig was approached with a problem he would diligently work on it and the chances were high that he would take the time to prepare a detailed answer often in the form of a lengthy document detailing all assumptions, derivations, limitations, etc., together with novel solutions and suggestions. For example, and this is no isolated case, in the late 1980's Peter Rochford and I approached Hennig to help us understand an apparent contradiction in Roughton and Forsters classic 1956 gas exchange paper. Several weeks later we received a massive 40-odd page typed (single spaced) reply! As Hennig once said to me "some questions/problems cannot be adequately answered in a single sentence", and he was usually correct.

Safe Handling of Gases (Material supplied by Commonwealth Industrial Gases Ltd (now BOC) with editorial notes)

This article summarises the rules for the safe handling of compressed gases and cylinders. The Editor's note provides a brief review of carbon monoxide and Freon 22, used in many lung function laboratories.

Mouth-Piece

Segments included References of Interest, Product Releases (Biox IIA oximeter and Dom X oxygen concentrator), NSW Branch News and an Announcement that on 19 May Peter Rochford had been appointed Sub-Editor of VOLUME.

Please contact me if you are interested in a copy of this or any other issue of VOLUME.

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