CORRESPONDENCE

THE HEAT MECHANICS OF THE WATERS CANISTER

Sir,—Dr. Ainley-Walker's article, "The Heat Mechanics of the Waters Canister" (January 1949) is a welcome contribution to the literature on this method of CO₂ absorption. By its simplicity and low cost the Waters canister has retained its popularity in face of growing competition from the circle absorber.

However, one or two of the conclusions drawn may be misleading. For instance, the statement that "the temperature of the inspired gas rarely exceeds that of the patient" may be true at the ambient temperature in which this series of readings was made, 76°F. Such a generalization may not be valid if one is working in a temperature of 80–90°F, which may be the common experience of many readers, either through poorly designed theatres, climatic conditions, or both.

It would have been interesting if the author had compared his results with those of some American workers. Clark et al. (1954) using a "to and fro" system, found their average temperatures to be 116°F in the canister, and 102°F in the gases passing into the trachea from the tip of an endotracheal tube. Burstein and Mark (1948) found inspired temperatures in the region of 104–113°F, when room temperatures were above 85°F, and suggested the use of ice as a coolant.

Furthermore Dr. Ainley-Walker states that "no evidence has been found to suggest that the presence of a hot canister near the patient is in any way harmful, but rather the reverse", even though one of his patients appears to have been inhaling gas at a temperature of approximately 42°C (107°F). What effects were actually looked for in those cases in which the inspired gas temperature was above that of the patient? It would seem necessary to include studies on bronchial dynamics, ciliary movement, intratracheal condensation of water vapour, etc., before drawing such a conclusion, even if no gross disturbance was manifest at the time of operation. Similarly, observations on the temperature of the patients would have been welcome.

Was the writer entirely satisfied with the performance of the canister in the matter of CO₂ absorption in the clinical experiments? Figures as to the inspired CO₂ concentration would have been useful in assessing this. Robson and Pask (1954) have shown how easily channelling can occur in the soda lime when the canister is lying on its side, with diminution of efficiency and consequent drop in heat production. Did Dr. Ainley-Walker use their suggested modification to ensure tight packing of the soda lime when the canister was lying horizontally?

Fortunately overheating effects can, to some extent, be offset by utilizing a high flow rate of gases and Dr. Ainley-Walker has shown a significant decrease in the temperature of the inspired gases when the flow was increased from 1.3 l. to 2 l. per minute. However, I have recorded a temperature of 110°F within a canister despite a flow of 4 l. when the room temperature was 84°F, which suggests that the heat loss by this route is limited, if in fact one is to utilize exhaled gases to any extent.

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REFERENCES

ACTION OF THE AZEOTROPIC MIXTURE

Sir,—When a new combination of drugs is introduced into anaesthesia, it is important that anaesthetists should not be unduly influenced by reports from the laboratory which may have little bearing in the clinical field, and which may contain conclusions not well founded. We have in mind the paper by Raventós and Dee (Brit. J. Anaesth. (1959), 31, 46), which appraises the value of the halothane-ether azeotropic mixture.

Having demonstrated that the small percentage of ether in the azeotrope contributes to its
anaesthetic effect, the authors proceed to a comparison, not between iso-narcotic concentrations of pure halothane and azeotrope, but between concentrations which contain the same percentage of halothane. Unlike Raventós and Dee, we have not been handicapped by lack of apparatus, since our colleague Dr. Epstein has constructed and calibrated an inhaler especially for the azeotrope. With this we have been able to use various vapour concentrations for clinical anaesthesia, and our impressions confirm those of others who believe that the azeotrope offers certain advantages over pure halothane, including a greater degree of freedom from depressant effects. Also, as would be expected, the azeotrope permits the use of a lower concentration of halothane vapour than when halothane is used alone. Work is in progress, but, as yet, we have insufficient data to bear statistical analysis. It is pertinent that Raventós and Dee themselves have not offered a statistically significant comparison, their only comment being that in their animals the relative changes in blood pressure and pulse rate are "about the same".

Some of the observations on the danger of explosion could easily mislead. The authors conclude that the lower limit of flammability of ether is approximately the same whether or not it is mixed with halothane. They then say that there could be a risk, therefore, of explosion when using the azeotrope in the higher concentrations needed for the induction of anaesthesia. Table I in their article shows that the lower limit of flammability of the azeotrope in pure oxygen is 8 per cent. We have seldom required, and never exceeded, a 3 per cent vapour of the azeotrope, in either oxygen or air. When increasing amounts of nitrous oxide are added, the azeotrope vapour concentration needed for induction falls correspondingly, and most clinical anaesthetists will agree that when the nitrous oxide in the mixture reaches 80 per cent (an example used by Raventós and Dee) unconsciousness will be produced without the addition of any azeotrope at all. In short, the laboratory data presented by the authors are irrelevant to the conditions of clinical practice.

It would be regrettable if this paper were to discourage anaesthetists from testing the value of a promising new mixture. One of several attractions of the azeotrope not mentioned by Raventós and Dee, is that the advantages of a halothane-like anaesthesia can be provided at a greatly reduced cost.

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DISPOSABLE RECIPIENT SETS FOR BLOOD TRANSFUSION

Sir,—Several types of plastic disposable blood-transfusion recipient sets ("giving sets") have recently been distributed to teaching and other large hospitals for use and comment.

As the representative of the Faculty of Anaesthetists on the sub-committee of the British Standards Institution which is considering blood-transfusion equipment, I would welcome any comments and criticisms regarding or suggestions for improvement of the disposable sets now in circulation. Perhaps readers who feel disposed to help in this way would write to the following address:

Department of Anaesthesia,
King’s College Hospital,
London, S.E.5.

Information supplied would be regarded as confidential and passed on to the committee anonymously after correlation.

Yours etc.,
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