CORRESPONDENCE

Correspondents are asked to be brief

Anaesthetic Safety Devices

SIR,—It would be idle to guess at the number of episodes occurring in anaesthetic practice throughout the country in which the "in use" cylinder of oxygen inadvertently runs out, resulting in oxygen deprivation until the "full" cylinder is turned on. That such episodes do occur is a well-known fact and the fear of every anaesthetist. It is not a fact, however, that this supposes that anaesthetists are either unusually careless or negligent. It arises owing to a combination of the following factors: (1) Anaesthetic gases are being supplied from cylinder sources. (2) There is a natural tendency to economy. (3) The anaesthetist's attention is diverted at the moment he might have earmarked for a cylinder changeover.

While pipeline supplies reduce the incidence of gas failure, it is usual for supplies to originate from cylinders attached to anaesthetic machines and are thus destined to be exhausted at frequent intervals. The tendency to economy conditions the anaesthetist to delay changeover of oxygen cylinders until over three-quarters of the cylinder contents have already been used. That is to say, the execution of changeover is not earmarked until about one-eighth of content, equivalent to a pressure residue of some 250 lb/in^2 (17·6 kg/cm^2), is left—a point from which (depending on the prevailing flow rate) less than 15 minutes' supply may remain. The most important factor lies now in whether or not the anaesthetist is able to maintain his cylinder vigilance during his chosen changeover period. A common event which brings about an oxygen deprivation episode is when a previously tranquil anaesthetic conduct is suddenly interrupted by a diverting demand. Such demands may be the resuscitation of a newborn child, the setting up of a difficult infusion line, the correction of a faulty electronic monitor, etc.

Dr. R. Parfitt (22 September, p. 635) suggests criteria for an ideal anaesthetic (more correctly, gas failure) safety device. Because of the improbability of such a mechanism being readily available, the following oxygen system is suggested to overcome the problem in part. The system depends upon the alteration of one of the two pressure regulators pertaining to the oxygen cylinders being adjusted to reduce at a pressure of about 5 lb/in^2 (0·35 kg/cm^2) difference between them. Both cylinders are turned fully on, the cylinder reduced to the higher pressure decanting continuously into the common line, thus giving the patient supply while at the same time holding back decantation from the cylinder leading to the lower pressure regulator. When the "high pressure" cylinder unit eventually shuts off, the holding cylinder unit begins to decant automatically into the common line. The "high pressure" cylinder may be labelled "running" and the "low pressure" cylinder labelled "reserve". When automatic changeover of supply occurs, or has been noticed to have ocurred, the "running" cylinder is changed and the new cylinder takes over the running supply. The "reserve" cylinder, having temporarily given a supply, now reverts to its "reserve" status.

The advantages that can be claimed from this oxygen system for cylinders are: (1) inadvertent oxygen deprivation does not occur; (2) the anxiety of the anaesthetist using a running down cylinder is relieved; (3) economy is afforded and the need for frequent cylinder change at high residual levels is reduced; and (4) use of the system is optional, as the more conventional system can be readily employed. The disadvantages are: (1) owing to small changes of pressure in the common line leading to the flow meter bank, slight adjustments of the flow meter are necessary; and (2) if the system is improperly used, it is conceivable that both oxygen cylinders could become exhausted.

While the suggested system is neither unique nor innovationary, it seems to me to deserve publicity. I believe it has particular appeal to the single-handed anaesthetist, who is ever aware of the pitfall of depending upon constant cylinder vigilance when so many exigencies occur.—I am, etc.,

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SIR,—The Bosun oxygen alarm is now fitted to many anaesthetic machines and whistles when the oxygen is exhausted—but only if no one has turned off the tap from the nitrous oxide supply. When the tap is off, confidence in the alarm is a lethal trap and a lamentable example of how a good idea can go wrong in the unexpected conditions of practical use. The dangers are admirably presented in Dr. R. Parfitt's letter (22 September, p. 635), but my own experience suggests that the cure is not simple.

In a hospital to which I was attached I carried on a safety campaign for many years. At first sight it seemed easy to turn the tap on, unscrew the little lever which actuated it, and hide it. Then, for a while, every time the oxygen ran out the alarm went. However, as I later discovered, it was the custom in this theatre to turn off the oxygen cylinder at the end of the day. This did not operate the alarm, because the reducing-valve pressure which inhibited the whistle was maintained for several hours. When, in the small hours of the morning, the pressure finally dropped and the alarm was heard sounding behind closed doors the hospital would be alerted and the theatre sister called