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THE WIND OF CHANGE

The person carrying out artificial respiration is usually a layman, and, by medical standards, has only elementary understanding of the anatomical and physiological problems. Consequently one method must be chosen as standard or routine, and taught widely, in the hope that in most cases it would be the method best suited to the operator's skill and to the environmental circumstances. At present the Holger Nielsen method is the favoured one. It lends itself to lay instruction as a mechanically fairly precise manoeuvre, and it is capable of endless repetition on volunteers as training subjects. But in the last year or two powerful advocacy has appeared for the adoption of what has become known as the expired-air method of artificial respiration. In this, the expired air of the operator is blown into the lungs of the moribund subject. There is little need to refer to recent literature to discover its effectiveness; for a long time it was more generally known as mouth-to-mouth artificial respiration. The description in the Bible of what we might now call "Elisha's method"¹ is a classical one, and from Vesalius to the present day numerous writers^{2,3} have testified to the success of it. Moreover, it is of interest that the several recent physiological studies of the method—for example, that by Cox and colleagues⁴—indicate that the tidal volumes, and levels of carbon dioxide and oxygen in the subject's blood as well as the operator's, are all satisfactorily maintained. There can therefore be little dispute that expired-air or mouth-to-mouth artificial respiration by Elisha's method is as effective in the subject made moribund by accident as is intermittent positive pressure respiration in the patient deliberately made apnoeic during anaesthesia. It is also becoming clear that the tidal volumes resulting from the manual compression of the chest

are not only smaller than from intermittent positive pressure respiration⁵ but are adequate only in the hands of experienced operators and in healthy patients with elastic chest walls; in others, manual methods may be quite ineffective. The problem is now whether the expired-air method should be introduced into everyday use and the chest-compression method abandoned. The main objections have been put concisely by one group⁶ as being "(1) a reluctance and apprehension to breathe into an apnoeic person, the operator fearing infection and contamination; (2) invariable hyperventilation and frequent experiences of dizziness and fatigue resulting in decreased efficiency; (3) reluctance to participate in training programmes which teach this method; and (4) a risk of over-distension of the lungs, especially in infants and children." Another recent report⁷—on 21 Swedish cases—emphasizes that convulsions, trismus, and vomiting often accompany acute asphyxia. A minority (six) of the rescuers in that series are recorded as having felt distressed over their experience, but only in retrospect after completing the task.

Most of these objections are overcome by using a simple inflating bellows, of which several have been designed.^{8,9} If they are to be used, they must be kept very readily available. This is easily done in a clinical environment; some hospitals keep one of them in every ward. The same might be done at first-aid posts and dressing-stations in factories and mines. The reluctance to make personal contact with the subject is an understandable one. The following description was written in 1796²: "But as the insufflation of Air by mouth is a very Toilsome and Loathsome Act, and since accordingly an otherwise laudable delicacy of feeling usually prohibits both the Physician and other People of Propriety from using this method, especially in adults or People of advanced years who have been drowned, it is of only little use." To some extent this difficulty is overcome by the use of such devices as the Safar airway,¹⁰ the Brook airway,¹¹ and the Seeler mask.¹² The simplest of all these perhaps is an ordinary anaesthetic mask,¹³ the operator blowing through the hole while holding the mask firmly on the subject's face. A real difficulty in connexion with the widespread substitution of the expired-air method for the Holger Nielsen is the provision of subjects on whom large numbers of laymen can practise and learn the technique. To overcome it manikins have been designed¹⁴⁻¹⁶ on which the whole procedure can be performed with lifelike realism. This no doubt would go a long way to provide reasonable training.

The question, Will more lives be saved by Elisha's method than by the Holger Nielsen? is

¹ Kings 2, chapter IV, verse 34.

² Herholdt, J. D., and Rafn, C. G., *Life-saving Measures*, 1796, Copenhagen.

³ Waters, R. M., *J. Amer. med. Ass.*, 1943, **123**, 559.

⁴ Cox, J., et al., *Lancet*, 1960, **1**, 727.

⁵ Macintosh, R. R., and Mushin, W. W., *Brit. med. J.*, 1946, **1**, 908.

⁶ Tomaszewski, J. F., and Oliver, T. K., *J. Amer. med. Ass.*, 1960, **172**, 1888.

⁷ Elam, J. O., Ruben, A. M., and Greene, D. G., *ibid.*, 1960, **174**, 13.

⁸ Macintosh, R. R., *Brit. med. J.*, 1953, **2**, 202.

⁹ Hillard, E. K., and Mushin, W. W., *ibid.*, 1960, **2**, 729.

¹⁰ Safar, P., and McMahon, M., *J. Amer. med. Ass.*, 1958, **166**, 1459.

¹¹ Dobkin, A. B., *Lancet*, 1959, **2**, 662.

¹² Seeler, H. W., *U.S. Armed Forces med. J.*, 1959, **10**, 761.

¹³ Mushin, W. W., *Med. Ill. (Lond.)*, 1949, **3**, 495.

¹⁴ Ruben, H., *Brit. med. J.*, 1960, **2**, 465.

¹⁵ Dobkin, A. B., *Laicel*, 1959, **2**, 662.

¹⁶ *Brit. med. J.*, 1960, **2**, 1819.

¹⁷ Matthews, G., *Lancet*, 1960, **1**, 1070.

crucial, and its answer can come only from carefully collected observations made from the field of first aid rather than from the laboratory. We are still uncertain whether the new method will bring a greater liability to such hazards as the inhalation of vomit, over-distension and damage to the lungs by the high positive pressures which a vigorous operator can produce, the difficulty of maintaining a clear airway, the occurrence of cross-infection, the difficulty for the operator in maintaining ventilation for long periods of time; this will be learnt only by careful and patient observation in a busy first-aid area. There is already evidence, for example, that the method can empty the stomach of its contents.¹⁷

Certain things seem clear already. Every medical student must be taught, and indeed every doctor should know, that intermittent positive pressure is the most effective way of ventilating an apnoeic patient, and that this can be done in as simple a manner as holding a face-mask on the face and blowing into the hole. A simple inflating bellows of the type already mentioned would be a valuable if not an essential object in every ward, casualty room, and other places where artificial respiration might be performed by a doctor or nurse. The Elisha or expired-air method is worthy of the closest interest and trial. It ought to be adopted, at the very least, on an experimental basis by selected first-aid units which have frequent calls made on them for artificial respiration. Their results, and the observations of both medical teachers and lay first-aiders, could then be compared with those from other first-aid units using the more classical methods. In this way an objective comparison might be made of the real effectiveness in actual first-aid practice of the life-saving powers of one method as against another. If indeed the superiority of the expired-air method is certain under field conditions, the liability to undesirable complications is not introduced, and the problem of teaching the method is solved, there will then be little difficulty in overcoming the natural and understandable reluctance of leaders in the first-aid world to giving up such a well-tried, clearly understood, and easily taught method as the Holger Nielsen.

EPIDEMIC BRONCHIOLITIS

In Great Britain epidemic bronchiolitis in infants is commonest in winter and early spring. Few big centres of population escape in any one year.¹ Most writers on the subject²⁻⁵ agree that it seems to spread to infants from older members of the family who are suffering from a mild upper respiratory infection. The negative bacteriological findings, combined with lack of response to antibiotics, and its spread from

contacts with apparent mild virus infection, suggest that the cause is due to a virus or group of viruses at present unknown.²⁻⁶

While it may appear under many different names, such as asthmatic bronchitis, capillary bronchitis, virus pneumonia, and epidemic bronchopneumonia, the term epidemic bronchiolitis would seem to be the most satisfactory from both a pathological and clinical point of view. In fact, as J. B. Heycock and T. C. Noble have pointed out, this condition (with the exception of staphylococcal pneumonia) is synonymous with bronchopneumonia in infants.

Though it does occur in children of any age, the disease appears to produce serious effects only in children under the age of 2 years, and especially in those under 6 months. Even in this younger age group the symptoms can vary from the mildest upper respiratory infection to the most severe form of pneumonia seen—progress from the one to the other frequently taking only a few hours. It has been estimated that only 18% need admission to hospital.¹ Modern treatment has reduced the mortality to 1-5%,³⁻⁷ but the wide distribution of the disease among the population of young babies means that several of them die every year of it. While there is nothing to distinguish the early stage of the condition from that of any other upper respiratory infection, the onset of a severe paroxysmal cough very like whooping-cough, combined with marked respiratory distress, rapid grunting respiration, and a tachypnoea with rates up to 100, associated with little or no fever, are fairly characteristic of the condition. Examination of the chest in the early stages may reveal either localized or generalized crepitations. Some patients, especially those under 6 months, present the picture of bronchiolar obstruction, with general emphysema and fine rhonchi, so characteristic of asthma. But asthma is rare in children of this age and normally tends to clear rapidly in twenty-four hours. In an epidemic the distinction is usually easy.

Radiography of the chest may show various appearances, the two most common being normality and gross emphysema. Sometimes it will show patches of segmental or lobar collapse and patches of pneumonia, or a combination of any of these with emphysema.

¹ *J. Coll. gen. Pract.*, 1958, No. 19, 169.

² Hubble, D., and Osborn, G. R., *Brit. med. J.*, 1941, 1, 107.

³ Garrow, D. H., and Fawcett, J. W., *Lancet*, 1953, 2, 795.

⁴ Morrison, B., *et al.*, *ibid.*, 1957, 2, 1077.

⁵ Disney, M. E., Sandiford, B. R., Cragg, J., and Wolff, J., *Brit. med. J.*, 1960, 1, 1407.

⁶ Ross, E., *et al.*, *Postgrad. Med.*, 1957, 22, 87.

⁷ Heycock, J. B., and Noble, T. C., *Brit. med. J.*, 1956, 1, 438.

⁸ Dugdale, A. E., and McGeorge, M., *N.Z. med. J.*, 1960, 59, 227.

⁹ Morrison, B., *Lancet*, 1955, 2, 737.

¹⁰ High, R. H., *Pediat. Clin. N. Amer.*, 1957, 4, 183.

¹¹ *Text Book of Pediatrics*, 1959, edited by W. E. Nelson, Philadelphia.

¹² McLean, K. H., *Aust. Ann. Med.*, 1956, 5, 254.

¹³ Fearon, B., and Bain, H., *Trans. Amer. broncho-oesoph. Ass.*, 1956, 37th meeting, 33.

¹⁴ Jackson Rees, G., *Arch. Dis. Childh.*, 1959, 34, 358.

¹⁵ Walker, S. H., *J. Pediat.*, 1952, 41, 528.