Ozone in Ventilation: Revivification of Mice.

F. O. Anderegg and R. H. Carr.

There has been a considerable amount of discussion as to the value of ozone for ventilation. A summary of the situation was presented before this academy a year ago.[1] The work to be described here is a direct outgrowth of that report and describes some experiments to obtain direct evidence as to the value of ozone physiologically. In view of the success of Dr. Cunningham,[2] of Kansas City, in treating a great variety of diseases by the use of a tank in which the patient spends several hours each day at a pressure of some 15 pounds, it seems desirable to secure evidence as to whether the use of an activated form of oxygen might be beneficial. Some experiments of James Todd,[3] of Pittsburgh, in this connection are of interest.

In the work here described advantage has been taken of the fact that a mouse will die when left in contact with its own exhalations for a sufficient time. This period will vary with the weight, vigor, etc., of the mouse. By placing mice of equal liveliness in filter flasks and then drawing a slow stream of air through the bottles in series, the mouse in the last bottle would be expected to succumb first. In an actual experiment, some divergence is, of course, noted, caused by variations in individual mice. The procedure was to draw air at the rate of 25-50 cc. per minute through 8 or 10 bottles, each containing a mouse, until the mice in a larger number of the bottles exhibited marked lethargy. Then ozonized air was drawn through the bottles in the opposite direction and the revivifying effect noted. Different concentrations of ozone were used. The results obtained so far are rather of a qualitative than of a quantitative nature. To make them quantitative will require a large number of mice so as to largely eliminate individual variations. Sufficient mice for this purpose are being accumulated.

Certain preliminary conclusions may be drawn at this time. Mice which have become rather sick as a result of breathing their own exhalations can be revived by the use of ozone. The greater the concentration of ozone, or the greater the flow rate of ozonized air, the shorter the period of convalescence. On occasion, certain mice have succumbed completely to the poison, and these, of course, could not be revived. The revivifying effect of ozonized air was much greater than that of air free from ozone. The action of ozone seems to be to eliminate the poisonous exhalations by oxidation. Also, when drawn into the lungs, it tends to be selectively absorbed by the blood so that the oxidation of waste material throughout the system is accelerated. With

[1] These Proc. 1920. pp. 271-3.

[2] Floyd L. Parsons. Everybody's Business. Saturday Evening Post, April, 1921.

[3] Experiments with Oxygen on Disease. James L. Todd, New Era Printing Co., Lancaster, Pa., 1916.

the increased removal of waste and poisonous substances from the body, the animal begins to recover. When the ozonized air is started, it passes first into a bottle which contains a rather large amount of foul gases. Then, unless the flow rate is considerable, very little ozone will reach the second bottle. To make a fair test, ozonized air should be drawn directly into each bottle and the time required for recovery noted.

Summary.

Mice which have been poisoned more or less badly by their own exhalations may be brought back to their usual activity by ozone in concentrations estimated as from 1 to 10 parts per million.

Purdue University.