paper. Twelve animals were used as controls, in them both the smooth muscle of the bronchi and uterus responded to antigen and smooth muscle stimulants.

These results are in agreement with some unrecorded observations made on anaphylactic shock in sensitized guinea pigs fed on vitamin C deficient diet. In these animals the intracardiac injection of the second dose of horse serum produced typical anaphylactic shock with rigid distention of the lungs. Death usually resulted in 2 to 5 minutes both in these animals and in those on a normal diet.

The results do not support the general assumption that the reactivity of anaphylactic smooth muscle in different regions is essentially the same. A vitamin C deficient diet modifies the responses of the sensitized uterus without affecting the sensitized bronchi. This lack of parallelism is difficult to explain unless it be assumed that the uterine smooth muscle being limited to one sex, is more highly specialized and functionally more readily influenced by dietetic and other factors.

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Device for Automatic Measurement of Oxygen Consumption in Closed Circuit Type of Metabolism Apparatus.

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In the closed circuit type of metabolism apparatus the measurement of oxygen consumption is usually dependent upon changes in the internal pressure of the system. Inasmuch as carbon dioxide is rapidly removed by absorption in alkali, the consumption of oxygen necessarily leads to a reduction in pressure in a system of given volume. The rate of oxygen consumption is then ordinarily determined by measurement of the quantity of oxygen that must be added for restoration of the original pressure, or by compression of the residual gas through the addition of a measured volume of liquid.[1, 2]

The device now to be described is based upon the latter principle, and permits automatic measurement of the volume of liquid that must be added to maintain a constant pressure within the system. It consists of a 4-liter bottle which serves as an oxygen reservoir,

[1] Wesson, L. G., *J. Nutrition*, 1931, **3**, 503.

[2] Ebeling, A. H., and Corey, R. B., *J. Exp. Med.*, 1930, **51**, 41.

connected above with the measuring unit proper. This is a 15 cc. cylindrical cup into which water flows from an external feed line as the pressure decreases in the metabolism apparatus. As the cup fills, a float, carrying a light platinum bridge, rises and breaks an electrical contact which is maintained through mercury tubes in the base of the cup. This interruption in the circuit is recorded by a magnetically operated needle on a smoked-paper kymograph. At the same time the cup empties through a syphon attached to the side, the electrical contact is remade, and the water discharged from the cup passes through the syphon outlet into the oxygen reservoir. The displaced oxygen rises through a second tube and enters the space in the upper part of the cup. From here 2 other tubes run. The first, a mere capillary, is connected as a side line with the main circuit of the metabolism apparatus through which air is circulated by a blower. Pressure decreases in the animal chamber are thus directly transmitted through the capillary side line to the cylindrical cup. The second is an external feed line through which water enters and is connected with a source of running water which is maintained, through a simple overflow, at a constant pressure. When the metabolism chamber is empty the pressure head which is maintained in this outer feed line is necessarily equal to the pressure in the main circuit and water does not enter the measuring unit. But during a metabolism experiment the decrease in pressure resulting from the utilization of oxygen causes water to be sucked into the measuring unit in quantities sufficient to compensate for the pressure decrease.

The capacity of the syphon is readily determined by measurement of the average amount of water which passes into the reservoir at each discharge. As used for metabolism experiments with rats we have found 13 or 14 cc. to be a convenient capacity, as it ensures a discharge of the syphon every 2 or 3 minutes.

To guard against fluctuations in pressure due to changes in temperature, the oxygen reservoir and the animal chamber are kept in a water bath at $28.0° \pm 0.01°$. The metabolism room is maintained at $28.0° \pm 0.3°$.