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On continuous insufflation in fowls. A demonstration.

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For many years this laboratory was interested in continuous insufflation which was carried out on mammals. At this meeting we wish to demonstrate apnœa produced by continuous insufflation in fowls. As you know, in these animals the bones are connected with the air sacs and the lungs. In this chicken, air is driven through both humeri and it escapes through a tracheal cannula. When the air is driven under sufficient pressure the respiratory movements are entirely abolished; the thorax stands still mostly in an exaggerated state of inspiration. This standstill may be sustained for two hours and longer. By this method the organism is liable to be washed out of its CO_2 content more thoroughly than by any other method of artificial respiration or forced respiration. Nevertheless, the animals appear to be in a good condition with no symptom which could be interpreted as "shock". Furthermore, when the continuous insufflation is interrupted, one of the following conditions may follow, according to the duration of the standstill, the degree of pressure, and to the gas used. Either the inspiratory state may be converted at once into a continuous expiratory standstill (apnœa vera), lasting 20 to 50 seconds and gradually attaining the amplitude of the original respiratory oscillations; or the state of the inspiratory standstill continues, in a somewhat diminished degree, for many seconds before it is converted, abruptly or gradually, into an expiratory standstill. We shall mention briefly the facts that an admixture of ether to the insufflated air invariably prolongs the expiratory after-effect, and that an admixture of CO_2 (3 per cent.) prevents the standstill even during insufflation.

In fowls the expiration is normally of an active type and the expiratory standstill can only mean that after the interruption of the insufflation the expiratory muscles get temporarily into a state

of strong tonic contraction. Since the continuous insufflation washes out a good part of the normal content of CO_2 and since the effect and the after-effect of the insufflation practically consist at all times in a tonic contraction of either the inspiratory or the expiratory muscles, the conclusion seems warranted that a *reduction of CO_2 in the blood does not act as a reduction of a stimulus below the threshold value but, on the contrary, it serves as a stimulus for the production of a tonic contraction of the respiratory muscles, while the addition of CO_2 assists in the maintenance of the respiratory rhythm.*

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On the production of hyperglycæmia and glycosuria by magnesium salts.

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In their experiments on the action of magnesium salts, Meltzer and Auer observed that after subcutaneous injections of magnesium sulphate the urine of rabbits contains a reducing substance. Underhill and Closson, who later noticed the presence of hyperglycæmia after an intravenous injection of magnesium sulphate, ascribed the hyperglycæmia to the asphyxia which the magnesium salts produced in their experiment.

In a series of experiments which we have recently carried out on dogs, all the animals had from the beginning to the end of the experiment either intratracheal insufflation or the usual artificial respiration. The occurrence of asphyxia was thus excluded. The operative part was done under local anesthesia. In most of the experiments an $M/4$ solution of magnesium sulphate was injected intravenously. There was a considerable increase of the sugar content of the blood after the infusion practically in all experiments. In most cases the original glycæmia did not exceed 0.13 per cent., while at the end of the injection or some time later, the sugar content of the blood was often as high as 0.4 per cent. and even higher. In blood taken about an hour and a half after the end of