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### The action of ammonia upon the lungs.

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A study was made of rabbit and guinea pig lungs, and the effect of prolonged inhalation of ammonia in low concentration. The author used for this purpose a special apparatus, giving in the chamber a constant percentage of ammonia. Concentrations of 1.5, 0.5, 0.25 and 0.15 cc. of gaseous ammonia per liter of the chamber air were used. The experimental animals were kept in this chamber constantly until either death occurred or they were killed for examination. Their temperatures were taken daily, and they were weighed from time to time. Out of

a total of 22 experimental animals, 3 rabbits and 11 guinea pigs died spontaneously, and 3 rabbits and 5 guinea pigs were killed. There was a rise of temperature in all the experimental animals exposed to concentrations of ammonia above 0.15 percent, which was usually more noticeable about the middle or toward the end of the period of exposure. The maximum rise was usually  $0.3^{\circ}$  to  $2.5^{\circ}$  C. above normal. The clinical symptoms produced were those of a pneumonia. Autopsy and microscopical study showed chiefly catarrhal broncho pneumonia, associated in some cases with fibrino-purulent pleuritis and pericarditis. Lower percentage concentrations of ammonia in the inspired air more often caused pleuro-pneumonia, and higher percentage concentrations only catarrhal broncho-pneumonia. Rabbits were found to be less sensitive to the presence of ammonia in the inspired air than guinea pigs. Guinea pigs were able to tolerate 0.15 percent of ammonia for a month without visible external disturbance or apparent macroscopical changes in the lungs at autopsy; but at 0.25 percent of ammonia gas in the chamber, lesions in the lungs of guinea pigs were noticed. It seems, therefore, that the concentration of ammonia for domestic animals should be lower than 0.25 percent.

The pathological picture in the lungs produced by ammonia, in perfusion experiments or intravenous injection, is quite analogous to that produced by anaphylactic shock. In discussing this phenomenon the author makes the hypothesis that, under the influence of a sensitizing agent, the normal metabolism of ammonia in the organism is disturbed, and the liberated ammonia gives the resulting pathological picture of anaphylactic shock in the lungs. The author found also that habit formation (*Gewöhnung*) for ammonia gas, described by Lehmann and Seifert does not exist. Therefore Lehmann's conclusion that ammonia concentrations are harmless up to 0.5 percent in factory air for "habitual" workmen is open to question.