lowing a pollution of the drinking water supply is well known. Chronic biliary typhoid carriers may be made large reservoirs of *B. typhosus* as a result of an attack of diarrhea. Epidemics of typhoid fever following a large water-borne diarrhea outbreak, may be due to disturbances in the equilibrium between parasites and host, namely, to increase in the distribution of *B. typhosus* and increase in the susceptibility of the host.

## 4195

## Effect of Intratracheal Inoculation on Chronicity of Lung Abscess.

W. E. ADAMS, C. M. VAN ALLEN AND LOIS A. DAY.

*From the Department of Surgery, University of Chicago.*

It has been amply demonstrated experimentally that the type of organism infecting a lung abscess is important in determining the healing time. Thus, when *Staphylococcus aureus* alone is introduced into the lung parenchyma of dogs, abscesses are produced that heal within 4 weeks[1]; when a mixture of the common pyogenic bacteria is used, the abscesses heal more slowly[2]; the spirillum and fusiform bacillus of Vincent give rise to abscesses that last 2 to 3 months[3]; and *Tubercle bacillus* abscesses may require a much longer time to heal.[4]

The purpose of the following experiments is to determine whether a lung abscess infected with an organism known to produce only acute lesions may be rendered slow to heal by intratracheal insufflation of organisms which are capable of originating chronic lung lesions. Dogs were used, and lung abscesses were obtained by liberating infected emboli into the venous stream (Cutler,[5] Holman[6]). Intratracheal insufflation was done with the animal deeply morphinized to control the cough reflex, and thinned sputum was used, obtained freshly from patients with chronic lung suppuration.

Group A. 14 dogs. Embolus with *Staphylococcus aureus*. 3

[1] Van Allen, C. M., *Deutsche Z. f. Chir.*, 1928, ccix, 1.

[2] Holman, E., Chandler, L. R., and Cooley, C. L., *Surg., Gynec. and Obst.*, 1927, xliv, 328.

[3] Weidlein, I. F., and Herrmann, L. G., *J. Am. Med. Assn.*, 1928, xci, 850.

[4] Van Allen, C. M., Adams, W. E., and Day, Lois, unpublished work.

[5] Cutler, E. C., and Schlueter, S. A., *Ann. Surg.*, 1926, lxxxi, 256.

[6] Holman, E., Weidlein, I. F., and Schlueter, S. A., PROC. SOC. EXP. BIOL. AND MED., 1926, xxiii, 266.

died of pneumonia. 11 sacrificed at 30 days. Results: healed abscesses.

Group B. 6 dogs. Embolus with sputum from patient with bronchiectasis *(Fungus nocardia*[7]*)*. 1 died of pneumonia. 5 sacrificed at 30 days. Results: 4 with unhealed lung abscess cavities.

Group C. 6 dogs. Embolus with *Staphylococcus aureus*. 10 days later insufflation with sputum of bronchiectasis *(Fungus nocardia)*. 3 died of pneumonia. 3 autopsied at 30 days. Results: 1 with unhealed abscess cavity.

Group D. 9 dogs. Embolus with *Staphylococcus aureus*. 10 days later, insufflation with sputum of bronchiectasis (Vincent's organisms). 3 died of pneumonia. 5 autopsied at 30 days. Results: 5 with large unhealed abscess cavities.

Group E. 10 dogs. Embolus with *Staphylococcus aureus*. 10 days later, insufflation with sterile saline. 4 died of pneumonia. 6 autopsied at 30 days. Results: healed abscesses.

Group F. 21 dogs. Intratracheal insufflation, in 6 dogs of sputum of bronchiectasis, and in 15 dogs of sputum of bronchiectasis (organisms of Vincent). 9 died of pneumonia. 12 were autopsied at 10 to 30 days. Results: no abscesses.

It is to be seen that *Staphylococcus aureus* lung abscesses which heal regularly before 30 days, have frequently been made to persist as large, unhealed abscesses after 30 days by treating the animals on the 10th day with intratracheal insufflation of sputum infected with *Fungus nocardia* or Vincent's organisms. Insufflation with sterile saline does not have this effect. Insufflation alone with these organisms produces no abscesses.

We raise the question whether in man postoperative lung abscess which occurs from infected embolus may become superinoculated by mouth organisms through accidental insufflation and thereby assume the characteristics of bronchogenic abscesses.

[7] Tunnicliff, R., and Huber, H. L., *Trans. Chicago Path. Soc.*, 1927.