by clawing and a third from pneumothorax due to false passage of the tube into the lung parenchyma with subsequent perforation into the pleural cavity. The remaining 9 are healthy, lively animals with a bronchial fistula. If the fistula remained infected there has been no tendency toward closure up to the present time, a period of 4 months. However, if the infection clears up, as it has done in some dogs, there occurs a "crusting" at the broncho-cutaneous junction, with closure of the fistula by granulation tissue.

In some recent experimental work on bronchial injury and repair,[3] it was found that a bronchus 0.25 to 0.5 inch in diameter could be completely stenosed by repeated thermal cauterization. A complete stenosis was also obtained within 2 weeks with one application of a 75% silver nitrate solution. In view of these findings, it is reasonable to believe that a persistent bronchial fistula may be permanently closed by one of these methods.

4759

Changes in Humoral Immunity Occurring During the Early Stages of Experimental Pneumococcus Infection.*

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A study was made of the changes in humoral immunity occurring during the early phases of experimental pneumococcus infection in the dog and cat, employing the methods devised by Robertson and Sia[1] for demonstrating the presence of anti-pneumococcus properties in the serum of animals naturally resistant to this microorganism. It was found that with a generalized and overwhelming infection accompanied by early blood invasion, there was a prompt and rapid decrease in the concentration of natural humoral immune bodies which frequently disappeared entirely by the time of death. This same early diminution of humoral immune substances, opsonins, agglutinins, and pneumococcidal promoting bodies was observed to occur in animals recovering from a moderately severe generalized infection with the difference that the concentration of immune bodies

[3] Adams, W. E., and Livingstone, H., *Ann. Surg.* (in press).

* This work has been conducted under a grant from the Douglas Smith Foundation for Medical Research of the University of Chicago.

[1] Robertson, O. H., and Sia, R. H. P., *J. Exp. Med.*, 1924, xxxix, 219; 1927, xlvi, 239.

began to rise coincident with the onset of recovery. The decrease in concentration of humoral immune substances during a severe generalized infection appeared to be due to the combination of "S" substance with the normal immune bodies.

When the pneumococcus infection was more localized as in the case of true lobar pneumonia, a quite different sequence of events was observed to occur. Several animals in which extensive lobar pneumonia was produced showed well marked concentration of humoral immune bodies in the blood throughout the course of a fatally terminating infection.

These findings would suggest that after the inception of pneumococcus infection in the dog and cat the chief function of natural anti-pneumococcus substances in the blood is to limit or prevent blood invasion. In the presence of localized pneumococcus infection, the persistence of these circulating antibodies appears to have little effect either in preventing the spread of the process or determining the outcome of the disease.

4760

Ultraviolet "Point Radiation" Focussed Through a Quartz Rod and Effect on Fundulus Heart Beat.*

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In a series of papers, the first of which appeared in 1912, Tschachotin[1] described a method of focussing ultraviolet radiation into a cell by means of a system of quartz oculars and objectives in a microscope. The following experiments make use of a principle well-known to physicists, and recently demonstrated by Wolf[2] to be of value in biological experiment, namely that ultraviolet radiation will follow a quartz rod, be it straight or bent, because of internal reflection. If the rod is drawn out to a fine point, radiation effects may be limited to a small area.

As will be seen from the accompanying sketch, a quartz rod was placed at right angles and close to the burner of a mercury-vapor lamp. A shutter control was interposed between the rod and the

* Study supported in part by a grant from the Radiation Fund of the National Research Council.

[1] Tschachotin, S., *Biol. Centralblatt*, 1912, xxxii, 623.

[2] Wolf, E., *The Collecting Net* (Woods Hole), 1929, iii, 20.