

meanwhile. In one of these three pigeons bloody feces were observed.

These data show that soy sauce in some way stimulates the development of beri beri in pigeons, because none of the controls developed beri beri within the same period, although one month is usually sufficiently long for the occurrence of the disease. The case in which beri beri appeared strikingly early (in 6 days) is of particular interest.

### 3084

#### The relation of virulence to the pneumococcal activity of normal rabbit serum-leucocyte mixtures.

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Previous work by Robertson and Sia<sup>1</sup> has shown that the blood (serum and leucocytes) of certain pneumococcus-resistant animals possessed destructive properties for pneumococci not found in the blood of susceptible animals. This suggests that the natural immunity of pneumococcus infection depends chiefly, if not entirely, on the pneumococcal activity of the blood. In their studies pneumococci of high virulence only were employed, and the animals tested represented well marked examples of natural immunity and susceptibility, the dog and cat on one hand, and the rabbit and guinea pig on the other. It is a commonly observed fact that within a single species of any of the usual laboratory animals there occur wide variations in susceptibility toward different strains of disease-producing pneumococci, and that among the so-called susceptible animals such variations may be extreme.

Experiments were undertaken with the purpose of determining whether the immunity shown by a relatively susceptible animal, as the rabbit, against certain strains of pneumococci was asso-

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<sup>1</sup> Robertson, O. H., and Sia, B. H. P., *J. Exp. Med.*, 1924, **xxxix**, 219.

ciated with demonstrable pneumococcus-destroying powers in the blood. The technique employed was the same as that used by the above mentioned workers. This consists, briefly, in seeding varying quantities of pneumococci into mixtures of rabbit serum and leucocytes contained in small tubes, which are then sealed with paraffined corks and attached to an apparatus inside the incubator whereby constant agitation is carried on during incubation.

It was found that the rabbit serum-leucocyte mixtures possessed the power to kill avirulent pneumococci in relatively large numbers but failed to inhibit the growth of virulent organisms even in minute quantities. The results of numerous experiments in which all three types of pneumococci were employed indicated that the ability of a strain of pneumococcus to grow in rabbit's blood is dependent on its virulence for the rabbit. The extreme susceptibility of the very young rabbit to certain strains of pneumococcus of low virulence for full-grown animals was found to be associated with an absence of pneumococidal properties in the blood of the young rabbit. These findings suggest that the relatively susceptible animals possess the same type of defense mechanism against pneumococcus infection as do the highly pneumococcus-resistant species.

## 3085

Isolation and comparative action of ephedrine pseudo-ephedrine from ma-huang. (*Ephedra vulgaris*, var. *helvetica*).

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The alkaloids ephedrine and pseudo-ephedrine were isolated by Nagai<sup>1</sup> and Merck,<sup>2</sup> respectively, from *Ephedra vulgaris*. The Chinese drug Ma-huang, variously identified as *Ephedra vulgaris*, *Rich. var. helvetica*, *Hk. et Thoms.*,<sup>3</sup> *Ephedra equisetina*, *Bge.*,<sup>4</sup>

<sup>1</sup> Nagai, *Pharm. Ztg.*, 1887, xxxii, 700.

<sup>2</sup> Merck's *Berichte*, 1893, 13.

<sup>3</sup> Botanical Nomenclature, Commercial Press, Shanghai, 1917, 1004.

<sup>4</sup> Cowdry, N. H., *J. N. China Royal As. Soc.*, 1922, liii, 158.