bohydrate in 1% concentration gave films of 50 Å thickness. Application of the homologous immune serums of both horse and rabbit to such areas gave films of 100 Å. Pneumococcus type VIII carbohydrate in a concentration of 0.4% gave films of 25 Å. Here again, application of homologous immune serums from either horse or rabbit to the treated areas further increased the thickness 100 Å.

Our results with antipneumococcus type III horse and rabbit serums are in general agreement with those of Heidelberger and Pedersen[9] and Kabat and Pedersen.[10] The findings with types V and VIII antipneumococcus serums, on the other hand, strongly suggest that in the horse at least the size of the antibody protein molecule or aggregate varies according to the type of pneumococcus employed in its production. The reactions between other stearate-adsorbed antigens and their antibodies are now being investigated. A more extensive discussion of the material presented above, together with additional data, will be given in a subsequent communication.

Summary. From the above results it may be concluded that the monolayer film method provides a valuable means for the study of antigen-antibody systems as regards molecular dimensions, combining properties, and other aspects of their behavior.

9921

Effect of Cyclopropane on Intestinal Activity *in Vivo.*

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In a communication reported by Peoples and Phatak[1] it was shown that in the isolated rabbit's intestine cyclopropane up to 25% in oxygen when added to the solution in which the strip of intestine is suspended causes an increase in intestinal tonus. It seemed desirable to repeat this work in the intact animal. Accordingly, experiments were conducted on normal dogs prepared with Thiry-Vella fistulas[2] of the jejunum or of the ileum.

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9 Heidelberger, M., and Pedersen, K. O., *J. Exp. Med.*, 1937, **65**, 393.

10 Kabat, E. A., and Pedersen, K. O., *Science*, 1938, **87**, 372.

1 Peoples, S. A., and Phatak, N. M., PROC. SOC. EXP. BIOL. AND MED., 1935, **33**, 287.

2 Gruber, C. M., and Brundage, J. T., *J. Pharm. and Exp. Therap.*, 1935, **53**, 120.

Six dogs weighing from 10 to 16 kilos were used. Intestinal movements were recorded by inserting a balloon, connected to a water manometer as described by Jackson[3] into the lumen of the proximal end of the Thiry-Vella loop. Respiratory movements were recorded by a pneumograph applied about the chest and connected to a recording tambour. No pre-anesthetic medication was administered and all animals were anesthetized with cyclopropane and oxygen by means of a Foregger metric machine using the closed carbon dioxide-absorption technic[4] with an endotracheal airway. Guedel's[5] latest classification on depths of anesthesia was used to evaluate the degree of narcosis.

All the animals showed uniform results consisting of an increase of both intestinal contractions and intestinal tonus during the first and second planes of the third stage of cyclopropane anesthesia. During the third plane of anesthesia, tonus was still increased but contractions began to decrease. During the fourth plane of anesthesia, intestinal contractions greatly diminished while tonus remained increased. Upon lightening the anesthesia the same effects were observed in the various planes of anesthesia as those described upon deepening the degree of narcosis. The changes are recorded in Fig. 1. Intestinal contractions (waves in the kymogram) and

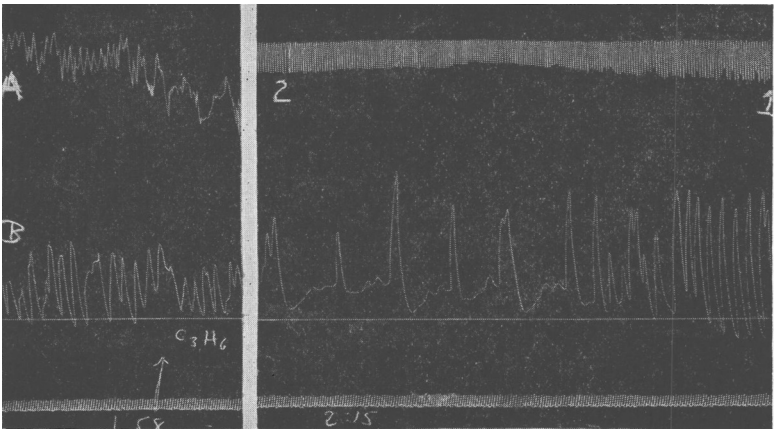

FIG. 1.

Effect of cyclopropane on intestinal activity in dog with Thiry-Vella fistula of the jejunum. Upper curves (A): thoracic respirations; lower curves (B): intestinal contractions.

[3] Jackson, D. E., *Experimental Pharmacology*, C. V. Mosby, St. Louis, 1917, p. 278.

[4] Rovenstine, E. A., *Am. J. Surg.*, 1936, **34**. 456.

[5] Guedel, A. E., *Inhalation Anesthesia*, Macmillan, 1937, p. 14.

tonus (represented by the distance above the base line) are seen, in Fig. 1-b, to be increased during the second plane of anesthesia.

The effect of ether in decreasing intestinal activity[6] was also confirmed.

Conclusion. Cyclopropane causes an increase of both intestinal contractions and tone in the first 2 planes of third stage anesthesia; in the lower planes of third stage contractions are inhibited but tone is maintained. Ether, on the other hand, causes an abolition of the contractions in all planes of surgical anesthesia.

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Response of the Optic Cortex of the Cat.*

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Following a single electric stimulus applied to the optic nerve, electrical potentials of 3 types are recorded from the optic cortex (Fig. 1). The first is a series of 4 or more spikes, each of 1 m.s. duration, comparable to the spikes of peripheral axons. The second is a series of waves, each of 5 to 10 m.s. duration, and the third, a series of waves of much longer duration (Fig. 2), comparable to the alpha waves. These slower potentials do not behave like after-potentials of the spikes. The first spike may follow a stimulus within 1.8 m.s. The following spikes occur at about 1.5 m.s. intervals, and are not simple repetitions of the first, but can be differentiated from it by differences in polarity at different depths in the cortex, by effects of anesthetics, etc. The spikes appear to represent activation of successive groups of elements rather than repetitive activation of one group. These spikes had not previously been recognized in the rabbit cortex, but with improved recording technic can now be seen to be present there also, of relatively lower amplitude. The short waves, 2 or 3 in number, correspond to those identified in the rabbit as the specific visual response. The long waves, often repetitive at 1/5 to 1/8 second intervals, correspond to the

[6] Miller, G. H., *J. Pharm. and Exp. Therap.*, 1926, **27**, 41.

* Aided by a grant from the Rockefeller Foundation for research in neurophysiology.