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Electron Micrographs of the Elementary Bodies of Fowl Pox and Canary Pox.

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The virus of vaccinia was the first of the pox group to be studied with the electron microscope. Pictorial data presented by Green, Anderson and Smadel¹ showed that the elementary bodies are roughly rectangular in shape, possess a limiting membrane and exhibit internal differentiation as shown by the presence of rounded areas of greater density than the remainder of the particle. These findings were confirmed by Sharp, Taylor, Hook and Beard² who, in addition, utilized the shadow-casting technic of Williams and

Wyckoff³ and presented evidence that the elementary bodies are essentially short cylinders. Inasmuch as the above studies have shown the elementary bodies of vaccinia to have definite and distinctive morphological characteristics, it was of interest to compare the morphology of the elementary bodies of fowl pox and canary pox with those of vaccinia.

Materials and Methods. Egg-adapted strains of fowl pox,* canary pox* and vaccinia[†] were studied in each case. Suspen-

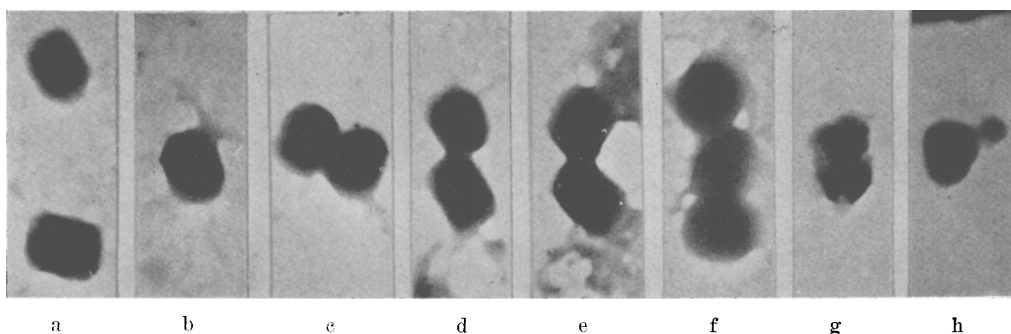


FIG. 1.
Elementary bodies of fowl pox. Magnification 29,200 $\times$.

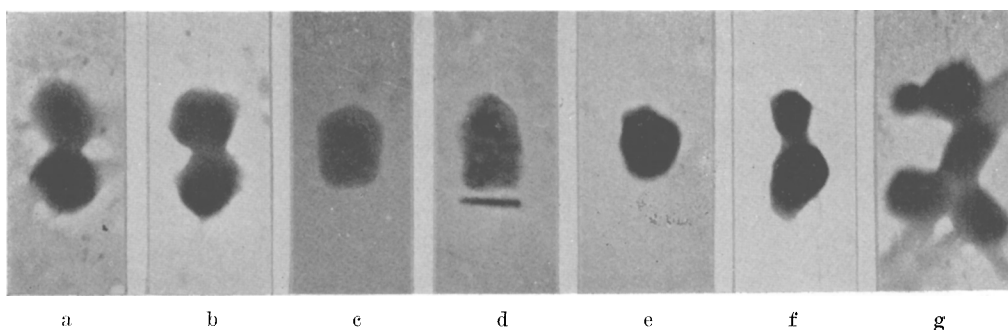


FIG. 2.
Elementary bodies of canary pox. Magnification 29,200 $\times$.

¹ Green, R. H., Anderson, T. F., and Smadel, J. E., *J. Exp. Med.*, 1942, **75**, 651.

² Sharp, D. G., Taylor, A. R., Hook, A. E., and Beard, J. W., *Proc. Soc. Exp. Biol. and Med.*, 1946, **61**, 259.

³ Williams, R. C., and Wyckoff, R. W. G., *Proc. Soc. Exp. Biol. and Med.*, 1945, **58**, 265.

* Strains obtained through the courtesy of Dr. F. R. Beaudette of the New Jersey Experiment Station, New Brunswick, N.J.

[†] Strain obtained through the courtesy of Dr. J. B. Nelson of the Rockefeller Institute for Medical Research, Princeton, N.J.

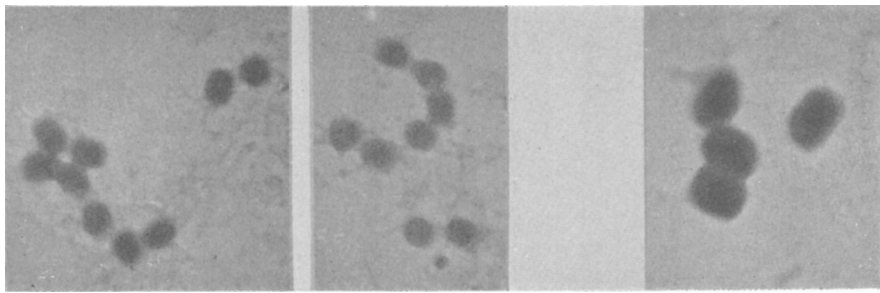


FIG. 3.
Canary Pox. Magnification 20,400 $\times$.

FIG. 4.
Vaccinia. Magnification 29,200 $\times$.

sions for examination in the electron microscope were prepared from heavily infected chorioallantoic membranes inoculated by Burnet's technic.⁴ The infected membranes were ground with sand and 10% suspensions in saline prepared. Partial purification of the elementary bodies was obtained by 2 or 3 cycles of differential centrifugation at speeds of 1,000 r.p.m. and 15,000 r.p.m. for 15 minutes and 45 minutes respectively. A small drop of the virus suspension was then placed on the collodion film support and the excess fluid removed with a fine pipette. After drying the film was washed with 3 drops of distilled water and again allowed to dry. The dried films were then examined in an RCA electron microscope (type EMU).

Results. It will be seen from the pictorial data presented in Fig. 1 and 2 that the elementary bodies of fowl pox closely resemble those of canary pox. Furthermore, although the elementary bodies of vaccinia (presented for comparison in Fig. 4) are somewhat smaller and narrower than those of fowl pox and canary pox, morphological characteristics observed in the elementary bodies of vaccinia^{1,2} are also evident in those of fowl

pox and canary pox. The particles of these avian poxes are approximately rectangular in shape (Fig. 1a-c and 2a-d) and like vaccinia the elementary bodies of these avian poxes occur singly, in pairs and in short chains (Fig. 3). However, the arrangement of the particles in pairs or chains is subject to considerable variation. Particles are most frequently attached to one another by their corners (Fig. 1d, e and 2a, b, g) but are occasionally attached side to side (Fig. 1c) or end to end (Fig. 3). The characteristically flattened corner frequently observed on many particles (Fig. 1b and 2c, e) and visible in the micrographs of vaccinia presented by other investigators,^{1,2} although not specifically commented on by them, probably results from the separation of 2 particles joined by their corners. Curious bud-like structures like those shown in Fig. 1h and 2 f, g, which usually also appear at the corners of the particle, are observed sufficiently frequently to lead to the belief that they are of significance. Studies on the nature of these structures are in progress.

Summary. The elementary bodies of fowl pox closely resemble those of canary pox and have many morphological characteristics in common with the elementary bodies of vaccinia.

⁴ Burnet, F. M., *Sp. Rep. Ser. Med. Res. Council, London*, No. 220, 1936.