matrix and may be considered as highly differentiated abnormal regions of the matrix initially induced by the viral materials absorbed by the healthy cell from the gut lumen. The virus bodies afterwards become differentiated from these stromata. The above observations indicated that, unlike the viruses of the nuclear polyhedroses which contain deoxyribonucleic acid only[8], those of the cytoplasmic polyhedroses would contain only ribonucleic acid. This was afterwards confirmed for the cytoplasmic polyhedrosis of *Sphinx populi*[9], in the polyhedra of which ribonucleic acid (0·9 per cent) was found but no deoxyribonucleic acid.

I am indebted to Dr. H. Hadjissarantos of the University of Athens for identifying the larvæ of *Thaumatopoea pityocampa*.

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Preservation of *Strigomonas oncopelti* in the Dried State

In view of the findings of Becquerel[1] concerning the resistance of a wide variety of protozoa and algae to drying, it is rather surprising that more extensive efforts have not been made to preserve these cells in the dried state as is so commonly done with other micro-organisms.

Daily and McGuire[2] have published some data on the preservation of algae in the dried state; but there appears to have been no similar work done with protozoa.

This communication is an account of one of several similar trials in which the trypanosomid flagellate, *Strigomonas oncopelti*, has been preserved by a method of drying previously investigated for the preservation of bacteria[3] (see particularly appendix). The organism was kindly supplied by Dr. B. A. Newton, of the Department of Biochemistry, University of Cambridge.

The cells dried were obtained from a culture which had been grown for three days at 25° C. in 100 ml. of 2 per cent glucose broth. The copious growth was centrifuged and the packed cells were resuspended in an equal volume of 20 per cent glucose. Four-drop volumes of the suspension were inoculated on to starch-peptone plugs which were then exposed to high vacuum to produce foams. The necks of the ampoules were lightly plugged with cotton-wool to reduce contamination risks. After 24 hr. on the manifold, the dried foams were sealed *in vacuo*. Some of the desiccates were stored at room temperature (*c.* 20° C.) and others were stored at 4° C.

Three ampoules from each storage temperature were opened after twelve months (the longest period so far tested), and 3 ml. of glucose broth was added to each ampoule. The ampoules were left at room temperature. All ampoules yielded heavy growths of the flagellates, turbidity appearing in those which had been stored at 4° C. in about 9 days and in those which had been stored at room temperature, some 3 days later.

It is not possible from these results to gauge the efficiency with which the organisms were preserved; but it seems of interest to record that a relatively complex micro-organism such as *Strigomonas oncopelti* has been recovered after storage in the dried state.

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Isolation of a Heat-resistant Variant of Polio-virus

It has been shown[1] that when preparations of MEF_1 (type II) polio-virus (*P. hominis*) are exposed to heat at 50° C., there is a marked reduction in the rate of inactivation as the exposure time is increased (see Fig. 1). Bodian *et al.*[2] have suggested that such a phenomenon occurring during the inactivation of polio-virus with formaldehyde may be due to (1) protection of some virus particles by aggregation, or (2) the presence of inherently resistant particles, and concluded that there was no evidence to support the latter possibility. Since either of these possibilities may explain our results with heat as the inactivating agent, they formed the basis of further experiments.

The MEF_1 virus was a strain previously described[3], and all infectivity titrations were carried out in cultures of monkey kidney epithelial cells grown in the bovine amniotic fluid medium of Enders. Two methods were used for eliminating aggregates of virus particles, namely, filtration of infected tissue culture fluid through a Seitz *E.K.* pad or centrifugation at 10,000 rev./min. for 1 hr. The fluids so treated were exposed to heat at 50° C. and afterwards titrated as described by Stanley *et al.*[1].

Fig. 1 shows no significant differences between the inactivation curve of the control fluid and that of the fluid which had been filtered or ultracentrifuged. It therefore appeared that in this instance aggregation was of little importance.

Infected tissue culture fluid, cleared by centrifugation, was then heated at 50° C. for 40 min. and passaged undiluted. Degeneration of the tissue culture cells

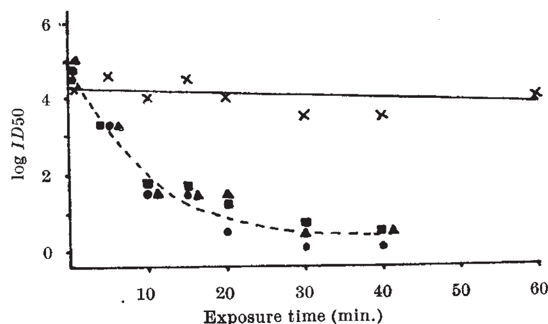

Fig. 1. Heat inactivation of *P. hominis* (50° C.). ×, Heat-resistant; ●, filtrate; ▲, infected tissue culture fluid cleared by centrifugation at 3,200 rev./min. for 20 min.; ■, ultracentrifuge supernatant

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