using a spray solution stronger than 10 p.p.m.; (2) applying the spray at an earlier date with reference to fruit maturity; and (3) combining the 2,4 dichlorophenoxyacetic acid with Carbowax and with naphthaleneacetic acid, or with both.

L. P. BATJER
P. C. MARTH

AGRICULTURAL RESEARCH ADMINISTRATION,
U. S. DEPARTMENT OF AGRICULTURE,
BELTSVILLE, MD.

INFECTIOUS MYXOMATOSIS IN MALNOURISHED RABBITS

THOMPSON[1] and Parker[2] have demonstrated that infectious myxomatosis is modified in rabbits exposed to high external temperatures. In preliminary attempts to determine whether or not chemically induced fevers have a similar modifying action, we studied the action of dinitrophenol in 12 rabbits. Six of these rabbits were injected with myxoma virus and sustained at fever temperatures by the subcutaneous injection of alpha dinitrophenol (20 mg/Kg of a 3 per cent. sodium salt) twice daily at 12-hour intervals. Two of these rabbits (as seen in Table 1) showed a delayed and modified infection. Since these two rabbits had a distinct loss of weight we decided to investigate further the effect of malnutrition on infectious myxomatosis.

Twelve rabbits were kept on minimal amounts (5 to 20 grams) of stock rations for a period of 10 days prior to the injections of virus and during the course of the disease, except where premature death was expected. Myxoma virus was titrated intradermally[3] and temperatures, weights, tumor measurements and clinical signs were recorded daily. Thirteen tumor biopsies were made serially on starved and well-fed rabbits and examined microscopically to determine the progressive pathology.

Microscopic study of the tumor biopsies revealed that the process of tumor formation was retarded in the malnourished rabbits. Table 1 presents data on 9 malnourished rabbits; 3 others died before any significant observations could be made. Tumors in the malnourished rabbits were delayed in appearance, and were definitely smaller than those in the controls in this series or in any of the well-fed animals in our previous study.[3] In one malnourished rabbit only a single minimal lesion appeared in one of the 16 injected sites.

TABLE 1

INFECTIOUS MYXOMATOSIS IN MALNOURISHED RABBITS

Number of rabbits	Treatment	Weight loss in per cent.	Days after virus injection: Lacrimal discharge	Secondary lesions	Death	Gross pathology of tumors*
1	Malnourished	16	0	0	7	+
1	"	22	8	0	13	+
3	"	23–26	7–9	0	10–11	+++
1	"	28	8	8	11	++
1	"	29	0	0	8	+
1	"	30	8	0	10	+
1	"	34	0	0	8	+
4	Dinitrophenol	0	6–8	6–9	9–11	++++
1	"	10	9	0	9	+++
1	"	25	0	0	7	+
7	None	0	6–8	5–8	8–13	++++

* ++++ = typical, large, cyanotic, raised; +++ = delayed, typical but smaller; ++ = delayed, only slightly raised; + = small, not raised or edematous.

Strict comparisons of the 50 per cent. end-points could not be made because of the atypical appearance of many of the dermal lesions in the starved rabbits. The delay in the appearance of lacrimal discharges—or the complete absence of such—and the absence of secondary lesions in 8 of 9 rabbits suggests that there was less generalization of the virus than in the controls. The known mortality rate of about 100 per cent. and the duration of the infection were not modified. It should be noted that 4 of the starved rabbits died showing an atypical clinical picture of infectious myxomatosis.

RALPH B. HOULIHAN

UNIVERSITY OF VIRGINIA
SCHOOL OF MEDICINE

W. ANSELL DERRICK

CITY LABORATORY, KINGSTON, N. Y.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

APPARATUS FOR GROWING MICROORGANISMS ON A FLOWING MEDIUM[1]

THE work of Shwartzman[2] describing the effect of Cellophane on penicillin production prompts us to publish the description of an apparatus used for growing microorganisms on cellulose tubing. We similarly used cellulose to increase the surface-volume ratio, but also to make a pathway through the growing fungus for the medium to pass into and out of the culture.

The apparatus (Fig. 1) consists of 50 feet of quarter-inch cellulose tubing[3] wound in a coil on

[1] R. L. Thompson, *Jour. Infect. Dis.*, 62: 307, 1938.
[2] R. F. Parker and R. L. Thompson, *Jour. Exper. Med.*, 75: 567, 1942.
[3] R. B. Houlihan and G. McL. Lawson, *Jour. Infect. Dis.* (in press).
[1] Journal Article No. 746 (n.s.) from the Michigan Agricultural Experiment Station.

[2] Gregory Shwartzman, SCIENCE, 100: 390, 1944.
[3] Blood transfusion tubing manufactured by Visking Corporation, Chicago, Illinois.