by the symbols 1, 5, and its antigenic formula is VI,VII:l,w-1,5. This is the second *Salmonella* type in which antigens l,w were found in combination with a nonspecific phase; the first is *Salmonella fayed* of Anderson, Anderson, and Taylor (J. Path. Bact., **59**, 533, 1947).

ADDITIONAL PROPERTIES OF THE MEF1 STRAIN OF POLIOMYELITIS VIRUS, ESPECIALLY WITH REFERENCE TO ATTEMPTS AT CULTIVATION IN THE CHICK EMBRYO

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Successful cultivation in fertile hens' eggs has been reported of Theiler's virus, TO, FA, GDVII strains, but not of poliomyelitis virus, Lansing, Y-SK, Ph, and several other human strains (Riordan and Sa-Fleitas: J. Immunol., **56**, 263, 1947; Dunham and Parker: J. Bact., **45**, 80, 1943; and others). These findings on TO, FA, and GDVII and on Lansing viruses have been confirmed in this laboratory.

In view of the fact that multiplication in chick embryos is a distinct feature separating so-called murine from poliomyelitis viruses and since the MEF1 strain (Schlesinger, Morgan, and Olitsky: Science, **98**, 452, 1943) has not as yet been studied in this regard, the present report on such studies including certain other properties is presented.

Chick embryos, 7 to 11 days old, were inoculated with a 20 per cent MEF1 virus as a mouse brain suspension, 0.03 ml intracerebrally, 0.25 ml into the yolk sac, or 0.1 ml on the chorioallantoic membrane (C.A.). The membranes were then incubated for 7 to 11 days, the yolk sacs for 11 days, and the intracerebral series, 7 days. The C.A. or embryo (or both) and brain in 10^{-1} dilution were subinoculated intracerebrally in mice. Blind passage from the inoculated embryos to 2 or more series of normal chick embryos was made along with subinoculation in mice. The result was that MEF1 virus was found to be incapable of multiplying in chick embryos even intracerebrally. It is of interest that in one instance in the C.A.-inoculated series the membrane in 10^{-1} dilution induced paralyses in the mice. Although the mouse brain virus was identified by positive neutralization with Lansing antiserum, it was proved by passage that the virus did not multiply in the membrane but that it only persisted in the inoculum.

In addition, the MEF1 after a large number of mouse passages exhibits a higher LD_{50} titer after intracerebral inoculation in the Rockefeller Institute strain of mice, viz., 3.0 to 4.2, than it does in the Lansing strain, which after many more mouse passages still shows the LD_{50} titer not to exceed 3 and at times

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less than 2. An added factor is the uniformity with which these animals respond to low dilutions of MEF1 virus as compared with the irregularity of reactors to those of the Lansing strain. This offers an advantage for certain experiments with rodent-adapted poliomyelitis viruses.

VITAMIN REQUIREMENTS OF BACILLUS COAGULANS

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During studies on some thermophilic members of the genus *Bacillus*, it was found that *Bacillus coagulans* NRS 27, a eurithermophile, could be serially cultivated at 37 C and at 55 C in a medium of the following composition: vitamin- and salt-free casein hydrolyzate, 1 per cent; L-cystine, 0.001 per cent; DL-tryptophan, 0.01 per cent; NaCl, 0.1 per cent; D-glucose, 0.5 per cent; K_2HPO_4, 0.5 per cent; thiamine, 1 μg per ml; niacin, 1 μg per ml; biotin, 0.04 μg per ml.

TABLE 1

Growth of B. coagulans NRS 27, at 37 C and 55 C, in casein hydrolyzate medium, with combinations of niacin, thiamine, and biotin

VITAMIN CONCENTRATION, μg/ML			GROWTH RESPONSE	
Niacin	Thiamine	Biotin	37 C	55 C
1	1	0.04	66*	53*
1	1	0.004	62	46
1	1	0.00004	41	25
1	1	0.0000004	10	0
1	1	0	0	0
1	0.01	0.04	0	0
1	0	0.04	0	0
0.1	1	0.04	66	53
0.01	1	0.04	62	51
0	1	0.04	0	0
0	0	0	0	0

* Average of replicate serial 48-hour transfers. Figures represent turbidity as measured with Fisher electrophotometer, 100 minus reading of light transmittance, using 425 B filter.

Table 1 shows the growth response of this organism to the three vitamins in the medium described above.

The results indicate that this organism requires a relatively high concentration of the three vitamins reported and each of these vitamins is essential