TABLE IV

EXTINCTION COEFFICIENTS OF VARIOUS CONCENTRATIONS OF ALUMINUM AURINE TRI-CARBOXYLIC ACID COMPLEX (ADJUSTED TO pH = 6.8)

| Concentration of aluminum | | Extinction coefficients | | | | | |
|---|---|---|---|---|---|---|---|
| mgm in 100 cc | parts per million | 520 mμ | 530 mμ | 540 mμ | 545 mμ | 550 mμ | Increase in E 545 mμ |
| None | None | .61 | .64 | .65 | .66 | .63 | – |
| .001 | 1 in 100,000,000 | .68 | .71 | .71 | .73 | .70 | .07 |
| .002 | 1 in 50,000,000 | .74 | .78 | .79 | .81 | .78 | .15 |
| .004 | 1 in 25,000,000 | .80 | .87 | .91 | .94 | .91 | .28 |
| .005 | 1 in 20,000,000 | .95 | 1.05 | 1.08 | 1.11 | 1.07 | .45 |
| .0075 | 1 in 13,300,000 | 1.03 | 1.16 | 1.23 | 1.26 | 1.22 | .60 |
| .01 | 1 in 10,000,000 | 1.14 | 1.28 | 1.36 | 1.39 | 1.34 | .73 |
| .02 | 1 in 5,000,000 | 1.67 | 1.84 | 1.97 | 2.01 | 1.94 | 1.35 |

lar rotation directly. The solutions were adjusted to a pH of 6.8. This proceeding served to reduce materially the fading with only a slight increase in the extinction coefficient value for the control solutions containing no aluminum. The results are tabulated in Table IV.

While these results in the minute concentrations do not show as sharp a proportionality as those previously mentioned, it may be stated in discussing the preliminary work here reported that we were troubled with several factors which would contribute toward the invalidation of the method as a quantitative procedure. The solutions containing the aluminum complex are subject to fading, which, however, reaches a negligible value under experimental conditions in about twenty minutes. The evolution of minute bubbles as a by-product of the neutralization reaction necessitates rapid work, and care must be taken that they do not accumulate on the cell faces. Finally in systems of this nature it is possible that polymolecular colloids are in fine suspension. All of these factors would contribute toward decreasing the sensitivity of the spectrophotometric method.

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## ISOLATION BY CATAPHORESIS OF VIRUS FROM VACCINIA-RECOVERED RABBITS

DOUGLAS and Smith[1] have shown that vaccine virus is ordinarily electronegative. We have found also that material containing vaccine virus wanders in an electrical field to the positive pole.

Cataphoresis was applied to recover virus present in small amounts in tissues. For, by this method, the virus can be concentrated at the anode from suspension of tissues which fail to reveal infectivity by the usual tests of animal inoculation.

The conditions of cataphoresis were as follows: time, 3 hours; milliamperage, 2 to 4.8; drop in potential, 1 to 2 volts; pH of the suspension (100 cc) of the tissue, 6.9 to 7.8.

By this method we were able to isolate active vaccine virus in suspensions of testicles from rabbits which had recovered from experimental cutaneous vaccinia. This was demonstrated by characteristic lesions in the skin and testicles of healthy rabbits injected with anodic material. The animals used for cataphoresis tests were injected intracutaneously with neurovaccine virus from twelve to fifty-six days prior to the experiment, and at the time their testicles were removed for examination the animals were wholly recovered from the cutaneous vaccine lesions and were apparently normal.

The isolation of the virus from animals wholly recovered from infection and in a healthy condition, and the failure thus far to obtain immunity in the case of filterable viruses unless living virus is used[2] should be considered in relation to the possibility that immunity in virus diseases is linked with the presence in the body of living virus. The ideas here expressed are being investigated at the present time.

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[1] S. R. Douglas and W. Smith, *Brit. Jour. Exp. Path.*, 9: 213. 1928.

[2] *Cf.*, "Filterable Viruses," edited by T. M. Rivers, Baltimore, 1928; and P. K. Olitsky and P. H. Long, *Jour. Exper. Med.*, 47: 835. 1928.