in pH is desirable in bone growing in tissue culture then it is in the direction of less rather than more alkalinity. These data are strong evidence against the widespread belief that the local factor in bone growth is a change in pH toward the alkaline.

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Response of the Syrian Hamster to the Virus of Newcastle Disease.

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The adaptation of the California strain of Newcastle disease virus No. 11,914 to the Syrian hamster through 12 intracerebral passages has been reported.[1] This Newcastle virus has been passed through 22 successive series of 10- to 12-day embryonated chicken eggs prior to hamster injection. Intracerebral culture in hamsters has been continued through 200 uninterrupted passages.

Infected hamsters used for passage were sacrificed while moribund. Suspensions were prepared by grinding the infected brain tissue in a mortar with alundum and diluting with physiological saline. The inoculum for the first 50 successive passages was approximately 0.08 cc of a 10% (10^{-1}) suspension; for the 51st to the 120th passage 0.03 cc of suspension of the same concentration was used; and after the 150th passage each hamster was inoculated with 0.03 cc of a 1% (10^{-2}) suspension.

The incubation period in the first 12 passages extended from 2 to 6 days. In these early passages symptoms of irritability followed by paralysis developed slowly over a period of approximately 2 days, and these hamsters remained alive for at least one day after becoming paralyzed. Approximately 50% of the inoculated hamsters of the first 8 passages showed irritability and increased sensitivity, followed by involuntary motor reactions and paralysis, before becoming moribund. After the eighth passage all inoculated hamsters developed the above-mentioned typical signs of central nervous system involvement.

From the 70th through the 120th passages, signs of central nervous system involvement were observed approximately 36 hours following inoculation, and most of the hamsters became moribund in 48 hours. From the 160th passage through the 190th passage the hamsters showed signs of central nervous system involvement in 24 hours and died within 36 hours of the inoculation. After the 190th passage infected hamsters showed signs of central nervous system involvement in 12 hours and 75% died within 24 hours.

Hamster brain suspensions from the 49th and 72nd passages titrated 10^{-3} by intracerebral inoculation in 4-week-old hamsters. The infected brain suspensions of the 200th passage titrated $10^{-4.25}$ in 4-week-old hamsters and $10^{-3.5}$ in adult hamsters, as is shown in the table.

Neither the egg-adapted nor the hamster-adapted Newcastle disease virus produced symptoms of disease in hamsters when injected subcutaneously, intramuscularly, intradermally, or intraperitoneally.[2] The hamster-adapted Newcastle disease virus after the 92nd passage was not pathogenic for chickens between 3 and 6 weeks of age when injected intramuscularly or subcutaneously.

[1] Reagan, Reginald L., Lillie, Mary G., Poelma, Leo J., and Brueckner, A. L., *Am. J. Vet. Res.*, 1947, **8**, 136.

[2] Reagan, Reginald L., Lillie, Mary G., Poelma, Leo J., and Brueckner, A. L., *Am. J. Vet. Res.*, 1947, **8**, 136.

[3] Reed, L. J., and Muench, H., *Am. J. Hyg.*, 1938, **27**, 493.

TABLE I.
Titration of the Hamster-Adapted Newcastle Virus of the 200th Passage.

Hamsters Age in weeks	Dilutions 10-1	10-2	10-3	10-4	10-5	10-6	Titer[3]
4	5/5	3/3	4/5	2/2	0/6	0/6	$10^{-4.25}$
12	5/5	4/4	2/2	0/6	0/5	0/5	$10^{-3.5}$

Numerator—Number of deaths. Denominator—Total number inoculated.

Summary. A California strain of Newcastle virus (No. 11,914) was carried serially by intracerebral inoculation through 200 passages in Syrian hamsters. The virus produced symptoms of irritability followed by involuntary motor reactions and paralysis. During the state of paralysis and while moribund, a large percentage of the infected hamsters showed marked labored breathing. The incubation period decreased gradually from 2 to 6 days in the early passages to approximately 12 hours after the 190th passage. Despite the apparent increased infectivity with progressive passages, the hamster-adapted Newcastle virus of the 200th passage titered only slightly higher in 4-week-old hamsters than that of the 49th or 72nd passages.

After the 92nd passage the hamster-adapted Newcastle disease virus was non-pathogenic for chickens when inoculated intramuscularly or subcutaneously.

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Artificial Enrichment of Beet Root Tissue with Glutamine.

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Current interest in glutamine as a metabolite in animal tissues has led to a demand for this substance for experimental purposes. Glutamine may be prepared in quantity from beet root tissue by a method modified from the original procedure of Schulze and Bosshard[1] by Vickery, Pucher and Clark[2] but the yield obtained is dependent upon the richness of the material employed and this may vary from about 2 g per kg of trimmed root tissue to as much as 5 g. However, samples that contain more than 3 g per kg are not common.

It was observed[3] some years ago that the roots become notably enriched in glutamine if beet plants are treated in the field with 2 M ammonium sulfate solution at the rate of approximately a ton of nitrogen per acre (37 liters of solution per 100 square feet), the plants being collected 4 to 10 days later. Under these circumstances, the glutamine content increased from less than 2 to about 3 g per kg. Beet plants growing in the greenhouse and treated daily for 18 days with 0.5 M ammonium sulfate in such a way that the cumulative supply of nitrogen was somewhat greater than was used in the field experiment yielded roots that contained as much as 8 g per kg of glutamine or the equivalent of 5.4% of the dry weight. However, the opportunity to prepare beet plants in this manner for glutamine isolation is seldom available to workers in biochemical laboratories, and it

* Died November 20, 1947.

1 Schulze, E., and Bosshard, E., *Ber. chem. Ges.*, 1883, **16**, 312.

2 Vickery, H. B., Pucher, G. W., and Clark, H. E., *J. Biol. Chem.*, 1935, **109**, 39.

3 Vickery, H. B., Pucher, G. W., and Clark, H. E., *Plant Physiol.*, 1936, **11**, 413.