those obtained on the rats given glucose alone that the response of the normal tolerance intact rats to injected glucose was not significantly altered by sodium chloride. On the other hand, the administration of *sodium chloride with glucose* to the "low tolerance" rats resulted in a normal utilization of glucose in all instances. The partially pancreatectomized rats likewise showed a normal tolerance to injected glucose solution containing sodium chloride.

As yet, no explanation of the favorable effect of sodium chloride on the utilization of intraperitoneally administered glucose by the intact diabetic rat and the partially pancreatectomized rat can be advanced. Further studies on this problem are in progress.

Summary. The report that approximately one-half of adult rats of the "Yale" strain show a diabetic tendency, as indicated by a low tolerance to glucose administered intraperitoneally, has been confirmed. This tendency is more marked in older rats than in younger ones. The administration of sodium chloride isotonic with the injected glucose results in a normal tolerance to glucose, both in intact rats showing the diabetic trait and in partially pancreatectomized rats.

11001

Ultrafiltration of the Virus of Infectious Avian Encephalomyelitis.

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The causal agent of the recently described[1-3] infectious avian encephalomyelitis or "epidemic tremor of young chickens" has been shown to pass through Berkefeld V and N, and Seitz 1- and 2-pad filters.[1-3] The present paper concerns experiments on ultrafiltration of the virus through gradocol membranes; thus a more precise measurement of its size might be acquired.

The membranes employed had an effective filtration-area of 5 cm^2 and were prepared after the method of Elford,[4] as modified in certain

1 Jones, E. E., *J. Exp. Med.*, 1934, **59**, 781.

2 Van Roekel, H., Bullis, K. L., and Clarke, M. K., *J. Am. Vet. Med. Assn.*, 1938, **93** (N.S. **46**), 372.

3 Olitsky, P. K., *J. Exp. Med.*, 1939, **70**, in press.

4 Elford, W. J., The sizes of viruses and bacteriophages, and methods for their determination, in *Handbuch der Virusforschung*, edited by Doerr, R., and Hallauer, C., Vienna, Julius Springer, 1938, Vol. 1, pp. 126-181.

particulars by Bauer and Hughes.[5] The procedure of filtration followed that employed by the latter:[6] positive nitrogen-pressure of 76 cm Hg and 9 or 10 cm³ of either stock-filtrate, or supernate after centrifugation, of the virus were used with each membrane. The stock materials just mentioned were prepared as follows: The filtrate was obtained by spinning at 2500 rpm for 10 minutes in a horizontal centrifuge a 1:10 dilution in 25% broth in saline solution of 3 pooled brains removed from birds at the height of experimental avian encephalomyelitis.* The resulting clear fluid was then passed through a 1-pad Seitz filter. The supernate was prepared by spinning the clear fluid just described in the Bauer-Pickels open-air centrifuge[7] at 12,000 rpm for 1 hour; 0.1 cm³ of each of the filtrates, or of the control materials as indicated in the table, was inoculated intracerebrally* in 9- to 16-day old chicks. When signs of encephalomyelitis were apparent their specific nature was ascertained by the familiar, characteristic pathological changes,[5] by transfer of the tissues of central nervous system to fresh birds, or by both methods (Table I).

The tabulated results indicate that with the exception of Experiment 3 in which, it is assumed, defective membranes may have been used, there is an apparent limit of filtration through a membrane of a porosity of 73 mμ A.P.D. While this is not as sharply demarcated as that obtained with certain other viruses such as with the two strains

TABLE I.
Ultrafiltration Experiments with Avian Encephalomyelitic Virus.

Avg pore diam. of membrane in mμ	Results of inoculation of filtrates in chicken			
	Exp. 1	Exp. 2	Exp. 3	Exp. 4
150	5/6*	—†	—	—
125	6/6	—	—	—
100	3/6	—	—	—
83	—	1/6	1/6	—
73	5/6	0/6	1/6	2/8
60	0/6	0/6	3/6	0/8
50	0/6	0/6	1/6	0/8
40	0/6	0/6	—	0/8
Virus control:				
Unfiltered	4/4	6/6	6/6	6/6
Seitz filtrate	2/4	4/6	—	—
Supernate after centrifugation 1 hr at 12,000 rpm	—	—	5/6	6/6

* Numerator represents the number of chickens showing encephalomyelitis and denominator the number of chickens used in the test.
† Not tested.

[5] Bauer, J. H., and Hughes, T. P., *J. Gen. Physiol.*, 1934, **18**, 143.
[6] Bauer, J. H., and Hughes, T. P., *Am. J. Hyg.*, 1935, **21**, 101.
* Full ether anesthesia was employed for all operative procedures on birds.
[7] Bauer, J. H., and Pickels, E. G., *J. Bact.*, 1936, **31**, 53.

of equine encephalomyelitic virus,[8] which are characterized by (a) high concentration of virus per unit-volume, and (b) a uniform, and readily discernible specific reaction of inoculated animals, two factors regarded by Elford[4] as essential for clear-cut results, yet the end-point of the avian virus that has neither of these high potencies,[3] is sufficiently indicated in the present tests.

In accordance with the Elford definition of end-point, *viz.*, a membrane just able to retain completely all the dispersed particles,[4] the limiting membrane in this instance is the one of A.P.D. of 60 mμ. Hence, by applying the Elford formula,[4] the size of the viral particle is in the range of 20 to 30 mμ. It is of iterest that this size is within the same range as that demonstrated for the viruses of equine encephalomyelitis and St. Louis encephalitis.[9]

Conclusion. The virus-particles of infectious avian encephalomyelitis as present in suspension of brain of chickens affected by the experimental disease were found to have a diameter of 20 to 30 mμ as determined by ultrafiltration through gradocol membranes.

11002

L Type Variant Forms in Cultures of Various Bacteria.*†

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In a recent publication[1] data were presented supporting the conclusion that the L1 organism isolated by Klieneberger[2] from cultures of *Streptobacillus monilliformis* is a variant form of the bacillus and not a symbiant. Dawson and Hobby[3] came to the same con-

8 Bauer, J. H., Cox, H. R., and Olitsky, P. K., PROC. SOC. EXP. BIOL. AND MED., 1935, **33**, 378; Tang, F. F., Elford, W. J., and Galloway, I. A., *Brit. J. Exp. Path.*, 1937, **18**, 769.

9 Bauer, J. H., Fite, G. L., and Webster, L. T., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 696; Elford, W. J., and Perdrau, J. R., *J. Path. and Bact.*, 1935, **40**, 143.

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1 Dienes, L., *J. Inf. Diseases*, 1939, **65**, 24.

2 Klieneberger, E., *J. Path. and Bact.*, 1935, **40**, 93; 1936, **42**, 581.

3 Dawson, M. H., and Hobby, G., Third International Congress for Microbiology, Abstracts of Communications, 1939, New York.