the other hand, the precipitin dilution scale is uniformly logarithmic throughout.

Since none of the data were presented in numerical form it was very difficult to determine the infectivity data from the graphs, especially in the distorted portion. However, close estimates were obtained, and these together with the seric-reaction data were replotted on standard semi-logarithmic paper. In the tobacco mosaic and tobacco ringspot, it was found that the datum points for infectivity and seric reaction of the unheated viruses do not coincide, the points for the virus of tobacco mosaic showing an especially marked departure.

Chester calls especial attention to the fact that his curves for the seric inactivation and infectivity nearly coincide for each virus, but this curve proximity is accentuated through the use of the logarithmic scale which compresses increasingly as the data increase in magnitude. By plotting these data on plain graph paper this relationship is much less striking, especially in those curves in the upper portion of the figure.

For purposes of interpreting the antigenic nature of a virus it seems apparent that the infectivity and the seric-reaction end points are of much greater significance than the other points on these curves. These end points seem to be close in the case of each virus given the temperature treatments. It appears also that these end points were close when the viruses were treated with chemicals.

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CLEAVAGE WITHOUT NUCLEI

WHEN unfertilized *Arbacia* eggs are centrifuged for four minutes at 10,000 X gravity in a sucrose solution isosmotic and of the same density as the eggs, so as to keep them suspended, they break into two nearly equal parts.[1,2] One of these parts is nucleated, *i.e.*, contains the female pronucleus, and the other is non-nucleated. This distribution is invariable; the nucleus always lies in the light half, under the oil cap. By treating the non-nucleate halves, which contain only yolk and pigment granules and the matrix or ground substance, with parthenogenetic agents, such as concentrated sea water, they throw off fertilization membranes. When transferred to sea water, cytasters soon appear, and after two hours cleavage planes appear in many of them. These divide the enucleate half-eggs sometimes into two equal cells, sometimes into two unequal cells and sometimes into three or four cells, equal or unequal. By subsequent cleavages, the enucleate half-eggs develop into blastulae, sometimes quite normal in appearance. Blastulae of approximately a hundred cells have developed from these activated enucleate half-eggs, though as yet no swimmers. Cleavage can therefore occur in eggs without either maternal or paternal nucleus. A full account of these parthenogenetic merogones with photographs will be published shortly.

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[1] E. N. Harvey, *Biol. Bull.*, 61: 273, 1931.
[2] E. B. Harvey, *Biol. Bull.*, 62: 155, 1932.

THE HATCHING OF EGGS OF THE SOUTHERN BUFFALO GNAT

IN the spring of 1927 and in other years since that time considerable numbers of farm animals, chiefly mules, have been killed in the lower Mississippi Valley by outbreaks of the Southern buffalo gnat (*Eusimulium pecuarum* Riley) (Simuliidae: Diptera). In former times this insect caused enormous losses of live stock in this region, but for some forty years prior to the present series of outbreaks, little was recorded concerning its depredations. That the sudden appearance of swarms of this pest is in some way dependent on spring floods has long been known, but the available information on the life history of the insect has failed to explain satisfactorily the phenomenon of this relationship.

After an investigation of the buffalo gnats that infest the lower Mississippi Valley, with special reference to *Eusimulium pecuarum*, Webster[1] stated that, so far as observed, the eggs of all the species dealt with hatch within a few hours, and the larvae live in the streams nearly an entire year before changing to pupae. The writer has for several years past made a careful search for young larvae of *E. pecuarum* in the gnat-producing rivers of Mississippi and Arkansas immediately after the spring outbreaks and also later in the summer.[2] During neither of these periods has he been able to find young larvae, although very small ones, which appeared to be *E. pecuarum*, were collected on November 22 and 23, 1932.

In April, 1934, several lots of eggs were obtained by confining gravid females of this species in jars over water. These jars were brought to the laboratory at Orlando, Fla., and were divided into two lots; one, in which the water was kept agitated and aerated by a continuous stream of air produced by a suction pump in a manner similar to that described by McCutcheon[3];

[1] F. M. Webster, U. S. Dept. Agric., 4th and 5th Annual Reports of B. A. I. for the years 1887 ad 1888; 456–465. 1889.
[2] G. H. Bradley, "Notes on the Southern Buffalo Gnat." (Accepted for publication in Proc. Ent. Soc. Wash.), 1935.
[3] F. Harold McCutcheon, SCIENCE, 76: 1975, 416–417, November 4, 1932.