TABLE 2

STERILIZING FLUID

$HgCl_2$	0.5	g
NaCl	6.5	g
HCl	1.25	ml
Absolute alcohol	500	ml
Water, to	1	liter

ethanol and by 5-min washing in sterile water, gave a high degree of freedom from infection without greatly disturbing the viability of the eggs. Since the eggs are handled in the sterilizing tube, there is little chance of infection from the atmosphere, but as an extra precaution, these operations are usually carried out in a large covered box previously sterilized with an ultraviolet lamp.

The sterile eggs are transferred from the grid of the inner tube (Fig. 1A) by means of sterile paper spoons (Fig. 1B) onto sterile agar plates. The larvae hatch out on the agar and are then picked off with a sterile platinum spoon and placed on the culture media under test. Using this technique it has been possible to set up experiments involving 3,000–5,000 sterile larvae born within 2 hr of each other. When only sterile eggs are necessary, they can be transferred direct from the grid to the medium being studied, and then even greater numbers can be handled successfully.

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Theory of the Electrodeposition of Metals from Aqueous Solutions

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One of the favorite topics of discussion on the results of research is the interpretation of what actually takes place at the surface of the cathode during metal deposition. If we review our findings over a period of almost fifty years, we may summarize as follows:

First, the deposition of a metal at the cathode implies the codeposition of hydrogen. Without hydrogen deposition there is no metal deposition. All metal deposits are crystalline and usually malleable. Amorphous metal deposits at the cathode are due to secondary reactions such as metal oxide to metal.

Second, the hydrogen layer at the surface of the cathode is relatively thin, approximately 0.0001 in. (2.5 micron), and comprises atomic hydrogen, molecular hydrogen, metal hydrides, atomic metal, and an intermediate stage between the metal ion and the metal crystal.

Third, for acceptable metal deposition the cathode surface layer just described must be neither too thick nor too thin: If the layer is too thick the unit metal crystal is not formed; and if the layer is too thin the discharged metal ion is not sufficiently well protected and no unit metal crystal is formed.

The thickness of an active cathode surface layer may be controlled in several ways:

a. *By temperature of cathode surface.* The higher the temperature, the thinner is the surface layer.

b. *By cathode current density.* Within certain limits the higher the cathode current density, the thicker is the layer.

c. *By mechanical means.* By selecting a cathode which is insoluble in the plating bath and moving it through the bath at a fixed rate, we find that the higher the travel rate of the cathode, the thinner is the cathode surface layer.

d. *By addition of catalysts to the bath.* Specifically, certain negative ions, such as sulfate ions (which function at the cathode), vary the thickness of the layer.

e. *By codeposition of a second metal.* The second metal should be comparatively easy to deposit.

f. *By addition agents electrophoretically deposited at the cathode.* The thinner the addition agent layer, the more metallic is the cathode deposit.

An Assay Method for the Behavioral Effects of L-Glutamic Acid[1, 2]

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In 1943, Price, Waelsch, and Putnam (*9*) reported that oral administration of DL-glutamic acid hydrochloride had a palliative effect on patients with petit mal or psychomotor seizures. They also reported improvement in mental and social behavior. Since that time other studies have been made, using subhuman as well as human materials, which confirm these results (*1*, *13*, *14*) and which attribute them to the action of the L-isomer (*11*). For each of these investigations another could be cited in which no beneficial effects of glutamic acid were found under presumably similar experimental conditions (*6*, *7*, *8*). The literature on this subject confronts the investigator at one and the same time with theoretical interpretations of facts (*12*) and with negative data, which make it seem that the facts requiring such interpretation do not exist (*10*).

One of the major difficulties has been the nonhomogene-

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tion, genetically homogeneous mice of the dba strain (line 1) were used. These are the result of more than 50 generations of brother × sister matings and are known to have a quantitatively predictable susceptibility to sound-induced seizures at a given age, when subjected for 2 min to a noise produced by a doorbell mounted on a circular galvanized iron washtub (*2, 3, 5*). The stimulus intensity is adjusted to approximately 100 decibels with a transformer. When a neutral solution of L-glutamic acid is administered to these animals for 8 to 14 days prior to exposure to audio stimulation, a statistically significant decrease in fatalities resulting from the audiogenic seizures occurs. Under standardized conditions, the magnitude of this decrease may be used to compare the relative effectiveness of various doses alone or with other substances or combinations of substances.

The glutamic acid was administered by subcutaneous injection at a concentration of 200 mg/ml. Each animal received 0.1 ml per 10 g body weight. Solutions were prepared in the manner described by Marx (*7*). The mice were tested for seizure susceptibility once daily, beginning with the 30th day of age. On these days, the glutamic acid was injected 30 to 45 min prior to exposure to the seizure-producing situation. Thirty-three animals (31 males and 2 females) were used in the control series. Fifty animals (21 males and 29 females) were used in the series receiving glutamic acid. The animals were fed a diet of Fox Chow Checkers and had access to food at all times. The data were tabulated as cumulative percentages for four trials.

A comparison of the treated and control groups reveals that the seizure incidence is not affected by the administration of glutamic acid, but the proportion of fatalities in the treated group is decreased by 18% ($t = 2.95$). This effect occurs primarily in males, where the decrease in fatalities below that found in the controls is 26% ($t = 3.53$). That for the females is 11%, but is not statistically significant ($t = 1.78$). Previous work has shown that untreated males are approximately 10% more susceptible to sound-induced seizures than are females (*3*). We therefore recommend that dba line 1 males should be used as the standard test animals.

These and other data will be presented and evaluated in greater detail in a forthcoming publication (*4*).

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The Recombination Coefficient for the F Layer[1]

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It seems probable that the time rate of change of maximum electron density does not give a true picture of the actual variations in ionization occurring in the F layer (*4*). We carried through an investigation to determine whether or not the total electron content of an ionospheric layer can be used for the calculation of α_T, the recombination coefficient for the region as a whole.

The equation

$$\frac{dN}{dt} = q - \alpha N^2 \tag{1}$$

states that the rate of change of the electron density at any level in the layer is equal to the number of electrons per cubic centimeter produced by any means less the number lost by recombination processes. We must look into the equation when $\frac{dN}{dt}$ is the rate of change of total electron content in a vertical column of unit cross-sectional area of height τ of the layer, and q is the total production of electrons in this volume. It has been shown that total electron content N_T of the layer below the level of maximum electron density can be computed (*3*) from:

$$N_T = 2/3\tau N_M \tag{2}$$

As far as q is concerned, we must assume for the present that the sun's ultraviolet light is the only agency responsible for the production of electrons in the layer. Considering only the F_2 layer, the number of electrons recombining with positive ions is proportional to the possible number of collisions of an electron and a positive ion, or

$$R \sim N_e N_+ \tag{3}$$

and α can be thought of as a proportionality factor which indicates what proportion of possible recombinations will probably take place. Since we lack precise knowledge of existing conditions, it is convenient to consider that the number of electrons is equal to the number of positive ions, or $R = \alpha N^2$.

For a layer in which the electron density increases with height according to a parabolic law, we have the equation given by Appleton (*1, 2*),

$$N_h = N_M \left[1 - \left(\frac{h_M - h}{h_M - h_m}\right)^2\right] \tag{4}$$

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