which they made their final transformation in less than a half hour. In actual time the transformation stage was reached by the glochidia *in vitro* more quickly than by the glochidia on the fish, but there may be several factors involved in this comparison. Certainly, however, the growth and development of the glochidia *in vitro* was not delayed.

Juvenile mussels which transformed in these artificial nutrient solutions were kept in river water for three weeks after transformation without the loss of a single individual, the juvenile mussels making excellent growth of both shell and soft parts during that time and seeming in every way to be very vigorous. This was a bit surprising, as there is known to be a rather high mortality, on the contrary, among mussels during the first few days after leaving the fish following the natural parasitic cycle.

The several series of glochidia carried in the various nutrient solutions *in vitro* showed that parasitic life on the fish is not essential to development and transformation if the proper food substances be supplied in the proper environment; that the glochidium receives by its encystment a much-needed protection against certain bacterial and protozoan enemies; and that the glochidium is a true parasite while on the fish, receiving essential food substances from the host fish. This last statement was repeatedly tested in a variety of experiments and the so-called protective physiological solutions containing only inorganic salts were neither adequate to produce growth and differentiation nor to maintain glochidia already well started on their way to transformation.

The successful solutions contained sodium chlorid, potassium chlorid, calcium chlorid, sodium bicarbonate, dextrose and a mixture of amino-acids, together with small quantities of phosphates and traces of magnesium salts. Detailed data of these experiments as well as experiments on glochidia taken directly from the maternal marsupium are to be published.

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CRITICAL POTENTIAL MEASUREMENTS: A CORRECTION FOR HIGH-EMISSION CURRENTS

IN experiments on critical potentials the voltage E_1 (Fig. 1) applied to a filament and grid is usually measured by means of the potentiometer R_1R_2.

When the current I_3 is zero, then

$$E_1 = \frac{R_1}{R_1 + R_2} E \qquad (1)$$

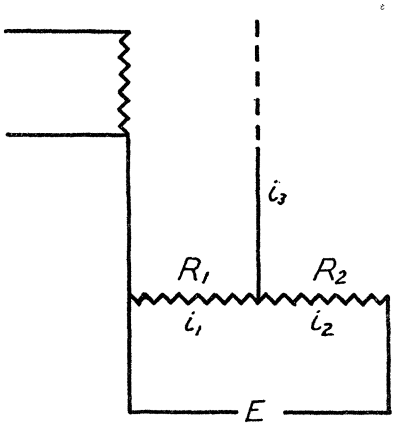

FIG. 1

However, if the current I_3 is large, then

$$E_1 = \frac{R_1}{R_1 + R_2}[E - I_3R_2] \qquad (2)$$

This equation is derived from Kirchoff's first and second laws

$$E = E_1 + E_2 \text{ and } I_2 = I_1 + I_3 \qquad (3)$$

and Ohm's law

$$E_1 = I_1R_1 \text{ and } E_2 = I_2R_2 \qquad (4)$$

Combining equations (3) and (4) and simplifying gives equation (2). In this derivation the laws for networks have been applied to conductors only, and no special assumption has been necessary regarding the resistance of the filament-grid space.

Equation (2) has been tested with a four-electrode tube containing helium. The following table shows clearly that the correction is a necessary one, when I_3 becomes large.

CRITICAL POTENTIAL OF HELIUM AT 0.3 MM PRESSURE

I_3 microamperes	Experimental Critical Potential in Volts uncorrected	corrected
2.4	21.01	21.01
160	21.63	21.24
800	23.50	21.39
	Average	21.21

A further correction for initial electron velocity and contact potential has to be applied to this value.

In another test a portion of the voltage E_1 has been measured with a standard cell, and it was found that equation (2) is correct.

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