calcification under the conditions of these experiments. Neither acidity nor rapid alternation between acidity and alkalinity is sufficient to cause significant calcification unless both calcium and phosphorus are present in excess. 6. The presence of iron was demonstrated wherever calcium deposits occurred.

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Current Intensity Factor in Electrocution of Paramaecia.

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The purpose of the present work is to determine in *absolute values* the intensity of current required to pass through a Paramaecium to disrupt it.

The organism, *Paramaecium caudatum,* cultured for 5 to 6 days in hay infusion, which consisted of Timothy hay boiled for 5 minutes in 100 cc. of distilled water and diluted to 500 cc. was introduced into a glass tube of known diameter and length. The tube was placed horizontally on a disc of hard rubber, the ends being immersed in big drops of culture medium into which the electrodes carrying the current (D.C.) were also introduced. The disc, placed on the stage of the microscope, was hollowed in the middle so as to allow the light from the condensor to pass through. Rheostats and milli- or microammeters, in series, completed the circuit. When a paramaecium came in sight in the tube the circuit was closed and the data taken. Selecting only those experiments in which the organisms were disrupted instantaneously (in less than 1/5 of a second) a "Band of killing intensities", extending from the intensities that killed about 5% to those that killed about 95%, was established for a set of tubes varying widely in diameter.

The following results were obtained: (cross sectional area of the tubes less cross-sectional area of the organism, in mm^2, in line A; band of killing intensities in microamperes, in line B).

A	0.14	.047	.048	.057	.277	.410	.488	.579	.827	1.126
B	7-10	9-13	9-11	12-19	35-68	44-62	59-66	85-95	100-106	144-186

A	1.192	2.258	3.786	4.128	5.461	6.502
B	130-136	353-375	539-631	650-677	854-887	1042-1097

The average of the 2 extreme intensities of the "band", plotted on the curve, (Fig. 1) show an evident linear relation.

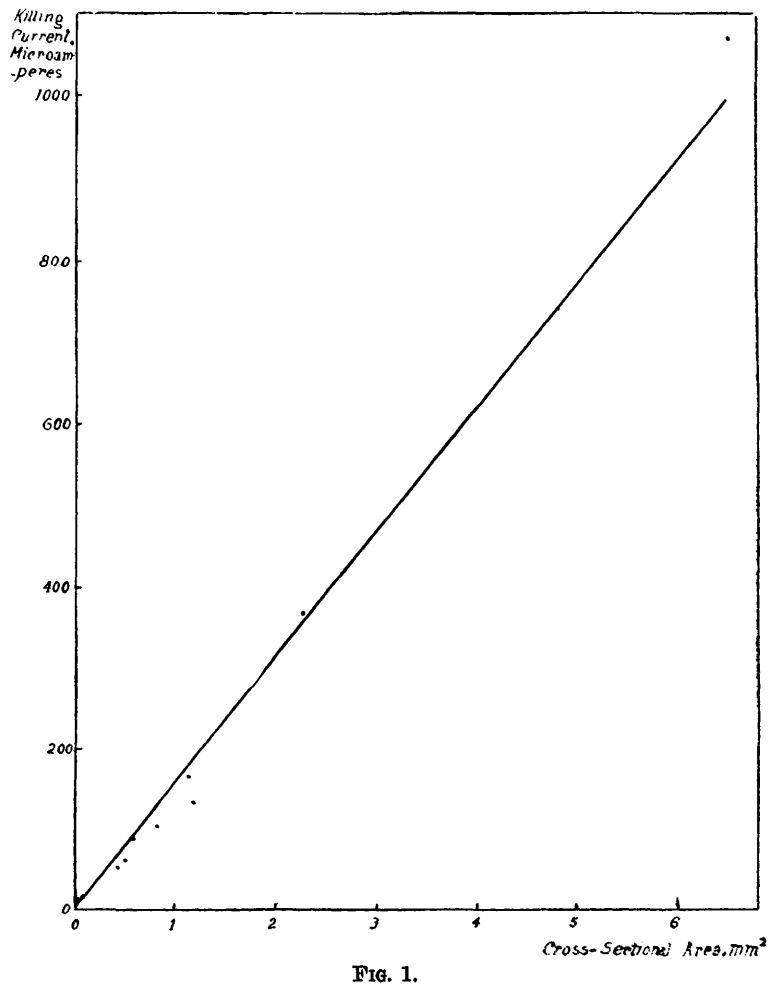

FIG. 1.

The system consisting of a paramaecium in suspension in its medium, in a thin glass tube through which a current is made to pass, can seemingly be compared to a system of 2 conductors in parallel, one being the organism and the other the column of liquid having the length of the paramaecium and surrounding it. Let then a, r, k, and i represent, respectively, the mean cross-sectional area, the total resistance, the resistivity of the paramaecium and the intensity of the current passing through it; a', r', k', and i' the corresponding quantities for the column of liquid above defined; and I the total intensity of the current passing through the tube. The formulas of conductors in parallel: $I = i + i'$ (1) and $ir = i'r'$ (2) give

$I = i + \frac{ik}{} a'$ (3), which means that the relation between the cross-sectional area of the tube less the cross-sectional area of the organism, and the intensity of the current passing through the tube—a part of which will kill the paramaecium—must be a linear one.

Analysis of the results leads then to the following conclusions:

1. The experimental curve is in good agreement with the above assumption on the distribution of the current through the organism and its surrounding medium, although it does not exclude some other interpretation.

2. If a' is made equal to zero the formula (3) reads $I = i$, which means that the intersection of the ordinate and the curve gives the intensity of the current passing through the paramaecium and killing it. That intensity, which may extend from 1 to 10 microamperes in the above curve, was found to be near 1 microampere in some later experiments.

3. If i is known and if r' can be determined, the formula (2) will give the resistance r of the paramaecium. The resistance r' of the medium was measured with the Leeds and Northrup conductivity measuring equipment. The resistance of the paramaecium was then found to be about 700,000 ohms and its resistivity 600 ohms. (The resistivity of the hay tea was 1896 ohms, the length of the organism has been estimated at 0.23 mm. and its mean cross-sectional area at 0.002 mm^2.)

I mention the present procedure as a means of measuring the resistance of organisms of the type paramaecium.

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Toxicity Study of Potassium Perrhenate.

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Rhenium, the third homologue of the manganese family, has been known to a few scientists for relatively few years. Although discovered in 1925, it was not obtainable until 1930. The relationship of rhenium to manganese and its chemical similarity to osmium made it appear worthwhile to investigate the physiological effects of the element. The investigation was necessarily limited to a few