

axis is between 6 and 13 microamperes per square millimeter of cross section.

Intensities slightly above the threshold for orientation exert no apparent effects, other than orientation, upon the growth process.

The occurrence of a definite type of quite constant bioelectric potentials in the stem of *Obelia* has already been demonstrated.¹ Recently it has become possible to measure these electrical potentials of internal origin. The results show that the magnitude of these inherent potentials is many times greater than would be required for the orientation effects in the growth process and consequently demonstrate the possibility that the living cells of the tissue possess a mechanism which might be brought into action in the rôle of a mechanism for cell correlation in growing tissues. The detailed experimental facts at the basis of the above suggestion will be presented in full elsewhere.

63 (2295)

Electrodes for the measurement of small bioelectric potentials.

By E. J. LUND.

[*From the Laboratory of General Physiology, University of Minnesota, Minneapolis, Minn.*]

In connection with studies on certain types of small constant bioelectric potentials (about 0.5 millivolt) it has been impossible to use any of the electrodes in common use in physiological work.

The common Zn-ZnSO₄ non-polarizable type cannot be duplicated and marked variation in the E. M. F. with time occurs also. It was found that the E. M. F. of the more stable calomel electrode was susceptible to light and could not under the working conditions be maintained within a variation of 0.2 millivolt.

Cadmium amalgam CaSO₄ electrodes (saturated type of half Weston element) have not yielded the expected constancy under working conditions. The most stable electrode which has been

¹ Lund, E. J., *J. Exp. Zool.*, 1922, xxxvi, 477.

tried so far, has been one made up with a three per cent pure lead amalgam and $PbCl_2$ in 0.05 to 0.01 molecular. The copper leads are dipped into copper amalgam instead of mercury. The drift in potential with time and at constant temperature was found to be sufficiently slow, and small enough to permit measurements of 1.0 to 0.05 millivolts with an error of about 0.01 millivolt under good conditions of experiment.

64 (2296)

Iodine metabolism on normal diet in relation to prevention of goitre.

By J. F. McCLENDON and JOS. C. HATHAWAY.

[From the Laboratory of Physiological Chemistry, University of Minnesota, Minneapolis, Minn.]

Since it would require 2,000 years to drink enough Lake Superior water to accumulate 20 mg. of iodine, and since the normal adult thyroid contains about this quantity and at least 50 per cent of persons drinking this or similar water escape goitre, there must be iodine in foods. We found that a man twenty-three years of age, living in a moderately goiterous region (Minneapolis), consumed 0.057 mg. of iodine in three days on a normal diet, and excreted 0.021 mg. of iodine during the same period, having retained 0.036 mg. of iodine in three days. At this rate, it would require about five years to accumulate 20 mg. of iodine.

The question arises why in a goiterous region some persons have goitre and some do not. From the following data it may be seen that persons eating much roughage and drinking much milk of herbivorous animals would be immune to goitre.

Food from Goiterous Region	mg. iodine per ton of dehydrated food
Wheat	1
Peeled and Cored apples	2.5
Oats (+ husk)	10
Skim milk	12
Spinach	18
String beans	29

The following table shows the cause for immunity in non-goiterous regions (figures denote mg. iodine per ton).

	Goiterous	Non-goiterous	Maine
	Minnesota	Connecticut	
Wheat	1	3.5	8
Oats (+ husk)	10	20	150