then decreases. This optium for sodium or potassium salts in concentrations between N/100 and N/1000 is on the acid side of neutrality, the more concentrated the salt the more acid the optimum.

In calcium salts a somewhat similar effect was noted with the exception that the optima lay on the alkaline side of neutrality, and the rate of locomotion decreased with increased acidity. Much less variation in rate of locomotion with CH of the solution was noted in the work with calcium salts.

In mixtures of sodium and calcium salts and potassium and calcium salts two optima in rate of locomotion were found, one in the neighborhood of pH 6.2, the other close to pH 7.5.

It seems that in sodium or potassium salt solutions either increase in cation concentration or increase in alkalinity produce decrease in rate of locomotion, whereas in calcium salt solutions either increase in cation concentration or increase in acidity produce decrease in rate of locomotion.

THE RELATION BETWEEN LUMINOUS INTENSITY AND RESPONSE IN THE CERCARIAE OF BUCEPHULUS ELEGANS

By GERRIT BEVELANDER, *Union College*

It is well known that in many organisms an increase in luminous intensity evokes a characteristic response. If the change to which these organisms are subjected does not take place rapidly, a response usually does not occur. It is evident therefore that the reaction is dependent upon the rate of change in light intensity. Reactions of this kind are now generally known as "shock-reactions" and are characterized by the fact that the energy necessary to induce a reaction must be delivered at a certain rate.

In many organisms it is not necessary to expose the photic receptors continuously in order to induce a response. The time during which the stimulating agent must act in order to induce a response has been designated as the stimulation-period, the time during which exposure is not necessary, the latent-period. The sum of the two periods is known as the reaction-time. The present investigation deals with the relation between intensity and various phases of response to light in the cercariae of *Bucephulus elegans.*

The Relation Between Reaction-Time and Luminous Intensity.

When the luminous intensity is plotted against the average reaction-time, the resulting curve simulates an hyperbola. This clearly shows that the relation between the two is an inverse one, that is, as the one increases, the other decreases. These results are in agreement with those obtained by other investigators on organisms such as the seedlings of *Avena, Mya, Ciona, Amoeba,* etc.

The Relation Between Luminous Intensity, Stimulation-Period, and the Latent-Period.

An analysis of the reaction-time shows that the stimulation-period varies inversely with the intensity, *i.e.*, the more intense the light the shorter the exposure required to obtain a response. It also shows that the latent-period varies with the intensity, the higher the intensity, the shorter the latent-period.

It was observed, moreover, that in all the specimens tested the energy required to induce a response rose to a maximum as the intensity increased and then fell, and that in nearly all the specimens, the maximum energy was in 6,000 m.c. This shows that unlike the results obtained in many other organisms, the relation it=K, where (i)= intensity, (t) the time, and (K) a constant, does not hold for cercariae under the conditions of the preceding experiment.

A STUDY OF SPONTANEOUS CANCER OF MICE IN TISSUE CULTURE

By MARGARET REED LEWIS, *Carnegie Institution of Washington*

Forty-two tumor bearing mice of several inbred strains were obtained from Dr. Lionel C. Strong of the Jackson Memorial Laboratory. Some of the mice had more than one tumor. The tumors consisted of different types of mammary gland carcinoma. Twenty to forty cultures were prepared from each of the tumors.

An abundant growth of the epithelial cells took place so that at the end of three or four days membranes of malignant epithelial cells two or three times as wide as the original explant surrounded the small bit of cancer. The cells grew out, forming broad flat cells much thinner than a section could be cut. In these cells it was possible to follow the behavior of the mitochondria, the granules, the nucleus, the nucleolus, and the chromosomes.

Many results were obtained and it is hoped that further study will reveal some interesting conclusions, particularly in regard to the behavior of the chromosomes in the tumors arising in the different strains of mice.

Most of the growth of the cancer cells contained dividing cells with more than the normal number of chromosomes.

The growth of the tumors found in certain strains of inbred mice contained more abnormal cells and abnormal mitotic figures than the growth of the tumors of other inbred strains. Results bearing upon the time of splitting of the chromosomes to form the two daughter chromosomes were obtained which probably apply to the dividing normal cells as well as to the cancerous cells. It is hoped that it will be possible to continue the studies on these tumors during the summer of 1932.