

The hemoglobin is lowered 2.8 gm. or 20%. This is the secondary anemia type.

The blood of the average baby contained 1.31 million red cells and 5.95 gm. of hemoglobin more than the blood of the average mother. Comparison of individual cases seems to present 2 types. In the case of the new born with 14.08 gm. of hemoglobin, the lowest of the babies, the mother had 9.11 gm. That is, the child is 17% below the babies' average and the mother is 14% below the average for the mothers. The child with the highest hemoglobin (19.87 gm.) is 12% above the average, and the mother of the child is 11% (12.56 gm.) above the average of the pregnant women. This suggests that the blood quality of the child may be expected to be in rather direct proportion to that of the mother. We find a similar condition in 29 (58%) of the cases. On the other hand, the mother with the highest hemoglobin (14.9 gm.) is 14% above average, whereas the child is 11% below average with 15.04 gm. In 24% of the cases there was such a change in the balance in favor of the mother. The woman with the lowest hemoglobin (7.04 gm.) is 30% below average for the mothers and almost 50% below normal. Her child, however, has a normal hemoglobin of 16.7 gm. Cases in which the balance is in favor of the child make up 18% of the series. These comparisons suggest that the "placental barrier" may function in one instance to conserve blood building elements for the mother at the expense of the child, and in another the child may be favored with material loss to the mother. This is not established by this experiment, but we hope to report further studies to clarify this point. Particular attention will be paid to cases which vary widely from the average or normal here established.

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Effect of Lithium, Ammonium, Strontium and Barium Ions Upon the Heart Rhythm of the Crayfish.

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The experiments on which the present observations are based are a continuation of a previous investigation (Lindeman¹) on the effect of various ions upon the heart rhythm of the crayfish *Cambarus*

¹ Lindeman, V. F., *Physiol. Zool.*, 1928, i, 576.

clarkii. However, instead of employing the normal blood ions, a group of closely allied ions, found in the same periodic classification of metals were employed, namely, Li, NH_4 , Sr and Ba.

The species of crayfish used was that of *Cambarus clarkii*. The same general technique was employed for obtaining graphic records as described in the above investigation. A normal perfusing solution containing 1% NaCl + 0.028% KCl + 0.024% CaCl_2 was employed as a control bath and as a basis for observing the effect of the solutions containing different ionic concentrations. The author has demonstrated in a previous paper that a 1% NaCl solution produces for a time a rapid decrease in tone and an increase in rate and amplitude of the beats. With continuous application, arrest is produced in about 30 minutes.

1% LiCl causes an increase in tone, followed shortly by arrest. However, upon the application of a 0.5% LiCl solution to the heart of a crayfish which has been beating normally with a normal perfusing solution, a decrease in tone immediately follows, coupled with an increase in rate and amplitude. With continued perfusing the rate and amplitude slowly decrease, with ultimate arrest in about 25 minutes. Because of the apparent similarity of 0.5% LiCl and the 1% NaCl in their action upon the heart rhythm of the crayfish, an attempt was made to replace part of the NaCl in the normal perfusing solution with LiCl. If the intact heart is perfused with a solution containing 0.3% LiCl + 0.7% NaCl + 0.028 KCl + 0.024% CaCl_2 , it will continue to beat normally for several hours. An attempt to completely replace the NaCl by LiCl proved less successful. Upon substituting a 0.5% LiCl solution for the 1% NaCl in the normal perfusing solution, a slight increase in tone occurs, coupled with a slight increase in rate and amplitude of the beats. However, with continued perfusing the amplitude slowly decreases resulting ultimately in stoppage after a period of 45 minutes. The results obtained by the writer for crayfish compare favorably with those obtained by Hogben² for *Homarus*, demonstrating that Li is unable to completely replace Na in the perfusion media. Within certain limits, however, Li and Na are quite analogous in their effects upon the heart rhythm of the crayfish.

It is generally recognized that Sr resembles Ca in its physiological action upon tissues and is capable within certain limits of replacing Ca in some physiological processes. Upon the application of a 0.024% SrCl_2 solution to the intact heart of the crayfish, a sharp increase in tone immediately follows, coupled with a slight irregu-

² Hogben, L. T., *Quar. J. Exp. Physiol.*, 1925, xv, 263.

larity in the rhythm and ultimately arrest in about 5 minutes. Subsequent application of normal perfusing solution results, in time, in complete recovery of the normal rhythm. In order to test the further relationship of Ca and Sr in their effect upon the heart rhythm of the crayfish, a 0.020% solution of SrCl_2 was substituted for the 0.024% CaCl_2 in the normal perfusing solution. Upon the application of such a solution to the heart a slight increase in tone generally occurs, coupled with a slight decrease in rate. With continuous perfusing this rhythm will continue in some cases for as long as 5 hours. It is therefore concluded that Ca and Sr have somewhat analogous effects upon the heart rhythm of the crayfish.

The power of Ba to replace Ca in this respect is undoubtedly very much more limited, although it is probably not entirely lacking. BaCl_2 always produces an increased tone of the heart which leads ultimately to systolic standstill.

Upon the application of a 0.024% BaCl_2 solution an increase in tone occurs, followed by an irregularity in the pulsations. Systolic arrest is generally obtained in less than 2 minutes. When 0.020% BaCl_2 is substituted for the 0.024% CaCl_2 in the normal perfusing solution and perfused through the heart a slight increase in tone occurs. With continued perfusion there is a slow decrease in the amplitude and force of the beats resulting ultimately in arrest in a few minutes.

NH_4Cl likewise has a depressor effect upon the heart rhythm of the crayfish. Upon the application of a perfusing solution containing 1% NaCl + 0.040% NH_4Cl + 0.028% KCl + 0.024% CaCl_2 , there occurs an increase in tone, a decrease in rate and amplitude, with systolic arrest within a few minutes. No recovery can be obtained.

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Inhibition of Oestrus in the Rat by Extracts of Corpus Luteum.*

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Although no data are recorded, Pereyra¹ (on the guinea pig) and Hisaw² (on the rat) pointed out the fact that inhibition of oestrus was obtained by acid alcoholic extracts of *corpus luteum*, but neither

* The expenses of this investigation were defrayed by a grant from the National Research Council, Committee on Research in Problems of Sex.