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**Effect of Gastric Juice on Erythrocytes of Newborn Rats.**

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There is no known condition in animals which resembles pernicious anemia in man. However, the fetuses and newborn of some animals have a macrocytic anemia (in comparison to adult values) which resembles to some extent the hematologic conditions found in pernicious anemia. This is especially true of the rat. If, through the use of materials effective in treating pernicious anemia, this hematologic picture could be converted into one resembling the adult, the newborn rat might provide a convenient method for the assay of anti-pernicious anemia substances.

Several reports might be cited in support of this possibility. The administration to the pregnant female rat of ventriculin,<sup>1, 2</sup> normal human and hog gastric juice,<sup>3, 4</sup> gastric juice from patients with achlorhydria and gastric carcinoma<sup>5</sup> has been shown to reduce the macrocytosis of the newborn rat. Gastric juice from pernicious anemia patients is relatively ineffective in this regard.<sup>5</sup> Liver extract injected into immature opossums for three to fourteen days while they were in the maternal pouch has been demonstrated to markedly affect the hematologic picture.<sup>6</sup>

On the other hand the possibility of using newborn rats is not supported by the results previously reported by us<sup>7</sup> and confirmed by Bruner.<sup>8</sup> A liver extract known to contain the antipernicious anemia factor did not affect the blood picture of the newborn rats of mothers receiving the treatment during pregnancy.

In view of these conflicting reports, we have repeated the work of Stasney and Higgins attempting to affect the macrocytosis of newborn rats by administering normal human gastric juice parenterally and orally to the pregnant mother.

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1 Briese, E., and Higgins, G. M., *Anat. Rec.*, 1939, **73**, 105.

2 Jones, O. P., *Anat. Rec.*, 1940, **76**, 34.

3 Stasney, J., and Higgins, G. M., *Proc. Staff Meet. Mayo Clinic*, 1937, **12**, 490.

4 Stasney, J., Higgins, G. M., and Mann, F. C., *Proc. Staff Meet. Mayo Clinic*, 1937, **12**, 399.

5 Schlicke, C. P., *Proc. Staff Meet. Mayo Clinic*, 1939, **14**, 145.

6 Stasney, J., and Burns, E. L., *PROC. SOC. EXP. BIOL. AND MED.*, 1939, **42**, 544.

7 Wigodsky, H. S., and Ivy, A. C., *PROC. SOC. EXP. BIOL. AND MED.*, 1938, **38**, 787.

8 Bruner, H. D., *PROC. SOC. EXP. BIOL. AND MED.*, 1939, **41**, 260.

*Methods.* Pregnant stock rats of our albino colony were used in this experiment. Gastric juice was obtained daily from normal human subjects following the injection of 1 mg of histamine subcutaneously. In the first series, the gastric juice was concentrated 10 times *in vacuo* and 1 cc injected intraperitoneally into the pregnant rat daily for 4 to 9 days before delivery. In the second series, 3 cc of fresh normal human gastric juice was administered by stomach tube to the pregnant rat daily for 4 to 10 days before delivery.

Hematologic examinations were performed as soon after birth as possible, or within 12 hours. Blood for cell counts, hemoglobin determinations, and smears were obtained by cutting off the tail of the newborn rat. Red blood cell counts were made in the usual manner. Hemoglobin was determined by the Newcomer method. The mean red blood cell diameters were determined on dry smears stained with Wright's stain.

The number of animals used in each group is shown in the table.

*Results and Discussion.* The averaged results are shown in the table. Although there were some significant increases in red blood cell and hemoglobin values in the newborn rats whose mothers had received gastric juice, the increases are neither large nor proportional

TABLE I.  
Erythrocyte Values of Newborn Rats Whose Mothers Received Gastric Juice.

Days treated	Method of administering gastric juice	No. Litters	No. Pups	R.B.C. $\times 10^6/\text{mm}^3$	Hemoglobin g/100 cc	Mean diameter, $\mu$
0	Controls	20	144	$2.89 \pm 0.02$ †	$14.11 \pm 0.13$	$8.42 \pm 0.02$
4	Injected intraperiton.*	1	5	$3.03 \pm 0.09$	$14.61 \pm 0.25$	$8.11 \pm 0.18$
5	" "	3	18	$2.93 \pm 0.05$	$14.27 \pm 0.06$	$8.35 \pm 0.04$
Avg	4 to 5 days	4	23	2.95	14.35	8.30
6	Injected intraperiton.	3	22	$3.10 \pm 0.07$	$14.17 \pm 0.21$	$8.33 \pm 0.05$
7	" "	3	20	$2.72 \pm 0.05$	$12.93 \pm 0.22$	$8.51 \pm 0.03$
9	" "	1	6	$3.36 \pm 0.09$	$15.96 \pm 0.32$	$8.25 \pm 0.06$
Avg	6 to 9 days	7	48	2.91	13.88	8.40
4	Stomach tube‡	1	9	$3.51 \pm 0.07$	$13.70 \pm 0.15$	$8.52 \pm 0.03$
5	" "	3	18	$3.14 \pm 0.07$	$13.71 \pm 0.27$	$8.52 \pm 0.03$
Avg	4 to 5 days	4	27	3.27	13.70	8.52
6	Stomach tube	4	23	$3.07 \pm 0.04$	$15.96 \pm 0.29$	$8.53 \pm 0.02$
7	" "	1	5	$3.26 \pm 0.15$	$15.70 \pm 0.50$	$8.45 \pm 0.03$
8	" "	2	20	$3.37 \pm 0.06$	$15.23 \pm 0.13$	$8.43 \pm 0.03$
9	" "	3	17	$3.19 \pm 0.06$	$13.44 \pm 0.20$	$8.35 \pm 0.02$
10	" "	1	9	$3.50 \pm 0.08$	$17.11 \pm 0.22$	$8.65 \pm 0.04$
Avg	6 to 10 days	11	74	3.24	15.33	8.47

\*1 cc daily, gastric juice concentrated 10 times *in vacuo*.

†Probable error.

‡3 cc daily normal gastric juice.

to the duration of treatment. In no instance was there a significant increase or decrease in the mean red blood cell diameters.

Stasney and Higgins reported only the largest diameters and mean corpuscular volume of the red blood cells in the newborn rats whose mothers received normal human and hog gastric juice but did not report the mean diameters. These "largest" diameters were measured from photographs of smears. The cells were selected at random and the largest diameter of the cell was measured, *i. e.*, if the cell was oval, the long axis was used rather than the short. This method appears to us to be too arbitrary to be used in determining the effect of anti-pernicious anemia material.

*Conclusions.* The administration of normal human gastric juice to pregnant rats by intraperitoneal injections of concentrated juice and by stomach tube of unconcentrated juice was without effect on the mean red blood cell diameters of the newborn rats.

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### Cultivation of Relapsing Fever Spirochetes in Embryonic Chick.

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(Introduced by C. W. Duval.)

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Since its use for the cultivation of a spirillum of fowls by Levaditi<sup>1</sup> and the fowl-pox virus by Woodruff and Goodpasture,<sup>2</sup> the fertile hen egg has been employed in the cultivation of many viruses. This medium was employed by Cox<sup>3</sup> for the cultivation of Rickettsiae, and has also been utilized in the study of bacteria<sup>4</sup> and protozoa.<sup>5</sup> Morrow, Syverton and their collaborators<sup>6</sup> employed the developing hen egg in the study of *Leptospira icterohemorrhagiae*, but Bessemans and De Meirsman<sup>7</sup> failed with *Treponema pallida*. Employing

<sup>1</sup> Levaditi, C., *Ann. Inst. Past.*, 1906, **20**, 924.

<sup>2</sup> Woodruff, A. M., and Goodpasture, E. W., *Am. J. Path.*, 1931, **7**, 209.

<sup>3</sup> Cox, H. R., *Pub. Health Rep.*, 1938, **53**, 2241.

<sup>4</sup> Goodpasture, E. W., and Anderson, K., *Am. J. Path.*, 1937, **13**, 149.

<sup>5</sup> Longley, B. J., Clausen, N. M., and Tatum, A. L., *PROC. SOC. EXP. BIOL. AND MED.*, 1939, **41**, 365.

<sup>6</sup> Morrow, G., Syverton, J. T., Stiles, W. W., and Berry, G. P., *Science*, 1938, **88**, 384.

<sup>7</sup> Bessemans, A., and De Meirsman, E., *C. R. Soc. biol.*, 1938, **127**, 847.