of endocrine-plumage relationship differs from that which was at first thought to be general. In these blackbirds the eye color also proves to be resistant to the effects of theelin and thyroxin.

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Some Effects of Alpha Dinitrophenol on Pregnancy in the White Rat.*

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It is a generally accepted fact that alpha dinitrophenol, when given in sufficient amounts, will raise the basal metabolic level and reduce weight.[1,2] There is sufficient proof that this action differs materially from that of thyroid,[3,7] and under ordinary circumstances does not damage kidneys or liver.[2,4] In spite of a raised metabolic level,[5,6] weight reduction does not occur when the caloric intake is increased above the individual requirement. We have been curious to learn what effects this drug might have on fertility, gestation, and fetal life. We therefore have studied this problem with the following points in mind: (1) Ability to become pregnant, (2) body weight changes during pregnancy and lactation, (3) Number and weights of young born, (4) Effect on suckling young, (5) number and weights of young reared.

Thirty-four female rats were studied in 3 groups:

Group 1.—Nine females were caged for 8 days for observation prior to the addition of males. This group received no treatment.

Group 2.—Five females were given 10 mg. of 1% aqueous solu-

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1 Tainter, M. L., Stockton, A. B., and Cutting, W. C., *J. Am. Med. Assn.*, 1933, **101**, 1472.

2 Tainter, M. L., Cutting, W. C., and Stockton, A. B., *Am. J. Public Health*, 1934, **24**, 1045.

3 Cutting, C. C., and Tainter, M. L., PROC. SOC. EXP. BIOL. AND MED., 1933, **31**, 97.

4 Dunlop, D. M., *Brit. Med. J.*, 1934, **1**, 524.

5 Tainter, M. L., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 1161.

6 Looney, J. M., and Hoskins, R. G., *New Eng. J. of Med.*, 1934, **210**, 1206.

7 Cutting, W. C., Rytand, D. A., and Tainter, M. L., *J. Clin. Invest.*, 1934, **13**, 547.

tion of sodium bicarbonate per kg. of body weight for the duration of the experiment. After the first 8 days males were introduced.

Group 3.—Twenty females were given 20 mg. of alpha dinitrophenol per kg. of body weight, administered as a 2% solution in 1% aqueous sodium bicarbonate. Males were introduced after the eighth day of the experiment.

All solutions were administered intragastrically twice daily until the respective litters were weaned. Cage temperature was maintained at a reasonably constant level. Food and water were supplied in abundance. Males were changed at intervals to insure successful breeding. Mothers were isolated as soon as pregnancy could be determined. All females and litters were weighed daily until the litters were weaned. The results are summarized in Table I, in which Groups 1 and 2 are unified for comparison with Group 3.

TABLE I.

	Group 1 and Group 2 Control and Bicarbonate	Group 3 Dinitrophenol Treated
No. Females Bred	14	20
No. Females Littering	14	18
Total Young Born	88	108
No. Young Born Alive	82	81
% of Young Stillborn	7% (6 rats)	25% (27 rats)
Aver. No. Young Born per Litter	6.3	6.0
Aver. No. Young Reared per Litter	5.07	3.01
% Mortality of Viable Young	13.4% (11 rats)	30.9% (25 rats)
% Viable Young Reared	86.6% (71 rats)	69.1% (56 rats)
Aver. Wt. of Young when Born	5.38 gm.	4.97 gm.
Aver. Wt. of Young when Weaned	24.23 gm.	27.19 gm.
Mother Aver. Body Weight Changes:		
Prepregnant to Littering	16.0 gm. Gain	17.0 gm. Gain
Littering to Weaning	28.1 gm. Loss	3.7 gm. Loss

Dinitrophenol-treated animals littered in 18 instances and 2 not littering were found to have a uterine infection common to breeding females. All control and bicarbonate-treated mothers littered. During the period of gestation, dinitrophenol-treated mothers gained an average of 17 gm. each as compared with 16 gm. each for the controls. In the period of lactation the dinitrophenol-treated mothers lost an average of 3.7 gm. each as compared with a loss of 28.1 gm. each in the controls.

The dissimilarity in loss of weight during the nursing period can be explained only in part on the basis of the average number of young nursed by each mother, *i. e.*, 5.07 in the control to 3.01 in the dinitrophenol group. Even if making a theoretical allowance for

this difference in favor of the control group, the discrepancy in weight loss in the 2 groups is considerable and demands further study.

The average number born in each litter was not affected by the use of dinitrophenol. For the dinitrophenol-treated mothers it was 6, while for the control group it was 6.28.

The average weight of young when born was 4.97 gm. each for the dinitrophenol group as compared with 5.38 gm. each for the control group. In the dinitrophenol-treated group, 25% of the total number of rats were stillborn, and in the control group only 6.81% were stillborn. Of the young reared to weaning, the average weight of those of the dinitrophenol group was considerably greater than that of the young of the controls.

It is of considerable interest that the mortality during the nursing period of the viable young born to mothers of the dinitrophenol group was 30.9%, as compared with 13.4% for the young of the control litters. We do not believe that the explanation rests with a disturbed milk supply. At the end of the nursing period the weight of the dinitrophenol young was greater than that of the controls, although the litters of the former were considerably smaller. Therefore, the available milk supply must have been abundant. We offer 2 explanations: (1) Dinitrophenol mothers neglect their young while in a febrile state, and only the more vigorous of the offspring manage to reach the mother for nursing. (2) A toxic agent is passed to the young through the milk, but as yet, we have no proof for this assumption.

Summary. (1) Dinitrophenol administered intragastrically twice daily, in 20 mg. per kg. of body weight did not appreciably affect the fertility of white rats. (2) This dosage of dinitrophenol in the presence of an unlimited diet did not appreciably affect the body weight gains of mothers during pregnancy. (3) Neither did it affect the average number of young born to each mother. Rats given dinitrophenol intragastrically will bear about as many young per litter as control rats, but the number of stillbirths is increased 3½ times over that of the control litters. (4) During the nursing period the mortality of the young of dinitrophenol-treated mothers was considerably greater than that of the young of control mothers.