

diet the animals have never been observed to suffer spontaneous convulsions, but convulsive seizures can be readily induced through application of a suitable stimulus, such as the hissing sound of an air blast. A striking observation is that the plasma magnesium content of these animals, while invariably lower than the content of the controls, falls within the range of variation which has been reported for normal animals. The body magnesium level, too, was found to be markedly reduced. Results of the plasma magnesium and body magnesium analyses are given in Table I.

TABLE I.

| Series | Time on diet wk. | No. animals in each group | Plasma Mg† | | Body Mg | | | | |
|--------|------------------|---------------------------|------------|--------------------------|----------|-------------|-----------|--------------|-------|
| | | | Controls | Mg deficient mg./100 ml. | Controls | Range | Mean | Mg deficient | Range |
| | | | | | | mg./100 gm. | gm. | body weight | |
| I | 7 | 2 | 3.75 | 2.65 | ‡ | 42 | ‡ | 28 | |
| I | 10 | 2 | 4.30 | 2.25 | ‡ | 32.5 | ‡ | 18 | |
| II | 8 | 4 | 2.55 | 1.55 | 38-42 | 40 | 26-29 | 27 | |
| III | 12 | 4 | 3.00 | 2.25 | 30.5-32 | 31 | 19.5-24.5 | 22 | |

† The plasma magnesium values were determined on pooled blood samples.

‡ Analyses differed slightly from each other.

The period of time required to reach the condition in which the rats are subject to convulsions was found to be markedly affected by the level of the vitamin G intake. Animals fed a ration low in G reach this stage much sooner than those given larger amounts of this vitamin. With an ample quantity of vitamin G and at the level of magnesium stated, there was not developed the trophic changes such as loss of hair, emaciation and edema of the feet, which are stated by Kruse, Orent and McCollum to be characteristic of the terminal stage of the deficiency.

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Failure of Theelin and Thyroxin to Affect Plumage and Eye-Color of the Blackbird.*

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Evidence from a number of sources has made it apparent that sexual differences in the plumage of the common fowl

* Supported in part by the Rockefeller Fluid Research Fund of the Stanford University School of Medicine.

(Gallus) are largely regulated by endocrine factors. In most breeds feathers of the male type are replaced, after administration of appropriate amounts of thyroxin, theelin or crude pituitary extract, by feathers resembling those of the female. Nevertheless, it is recognized that there are pronounced differences between breeds in their response to these prepared hormones.¹ For a time it seemed possible that the mechanism of differentiation in secondary sexual characters might be essentially the same in all avian species, the variations being only quantitative in character. Evidence seeming to point in this direction was obtained from a number of different orders and families.² More recently evidence of another sort has been accumulating. Males of the variegated South American plover, *Vanellus chilensis*,³ the pigeon and the guinea fowl, in all of which the sexes are similar, have shown no plumage response to the injection of theelin, nor in the latter species to castration. The plumage of the female guinea fowl is likewise unaffected by ovariectomy.⁴ The extensive studies of Keck⁵ on the English sparrow have shown that the distinctive plumages of the male and female of this species are not influenced by castration or by gonad transplantation.

These results indicate that the basis for the manifestation of sexual differences in plumage is not the same in all species. It apparently may differ radically within the same family (*e. g.*, *Fringillidae*),^{2, 5} when genera and even species may show interesting deviations,^{6, 7} some of which suggest those found in breeds of poultry.

The experiments reported at this time were carried out on one of the *Icteridae*, the common Brewer's blackbird (*Euphagus cyanocephalus*) of western North America. The birds were captured with a large net while roosting at night, and were kept during the period of observation in large screened yards with adequate shelter. The tests were made in the late fall of 1933, about 5 months after the end of the breeding season. The sexes in this species differ in color of the plumage and in color of the iris. Adult males are of a rich iridescent blue-black over the head, neck, breast, and anterior part of the body generally, while the corresponding regions of the female are of a dark brown or rusty black with slight iridescence. The iris of the male is very pale yellow, approaching white; that of

¹ Danforth, C. H., *J. Exp. Zool.*, 1933, **65**, 183.

² Morgan, T. H., Carnegie Inst. Wash. Pub. 285, 1919.

³ Vinals, Eduardo, *Comp. rend. Soc. biol.*, 1932, **109**, 1332.

⁴ Hardesty, Mary, *Anat. Rec.*, 1934, **50**, suppl., 55.

⁵ Keck, Warren N., *J. Exp. Zool.*, 1934, **67**, 315.

⁶ Mayr, Ernst, *Am. Mus. Novitates* No. 714, 1934.

⁷ Keck, W. N., and Witschi, Emil, *Anat. Rec.*, 1933, **57**, suppl., 28.

the female a rich dark brown. The male weighs about 70 gm., the female about 60 gm. Only males were used in these experiments.

Experiment I. On Nov. 8 feathers were plucked from regions on the head and breasts of 2 adult males. From Nov. 16 to Nov. 24, inclusive, each of these males received daily by injection into the pectoral musculature 2 cc. or about 100 rat units of theelin, the standard Parke Davis preparation being used. This was a total of 18 cc. or 900 rat units for each bird.

Experiment II. On Nov. 8, two adult males were prepared as above, and from Nov. 16 to Nov. 24 each of these was given 0.8 mg. daily of thyroxin by mouth. Squibb's thyroxin tablets were used.

Experiment III. On Dec. 12, two other males that had been similarly prepared were each given 3 cc. or 150 rat units, of theelin, and on Dec. 13, 14 and 15, 4 cc. daily in 2 injections, morning and night, in order to keep the concentration in the blood continuously high. On Dec. 16, each was given 3.5 cc. This is a total of 18.5 cc. or 925 rat units, of theelin to each bird within a period of 5 days.

Careful examination with the naked eye and hand lens revealed no changes in the color of the regenerating feathers or the irises of any of these treated specimens. The amount of theelin administered each day in Experiment I was, with reference to body weight about 3 times the amount that had been found to produce a "feminized" area in regenerating feathers of a male fowl following only 2 injections. Stated differently, if the male blackbirds had shown a response comparable to that of the fowl, per gram of body weight, the theelin injected into each bird would have been sufficient to produce detectible feminization of the regenerating feathers in at least a dozen specimens. In Experiment III the dosage for the 3 middle days was double the daily dose in Experiment I. Similarly, the daily thyroxin dosage was, in proportion to weight, over 6 times as great and was continued 3 times as long as would be necessary to produce marked effect in a male fowl. The experiments, therefore, may be regarded as entirely negative, indicating that at least in the season when the tests were made the reagents used do not exercise an inhibitory influence on the male coloring of either the plumage or the iris. Since in nature the birds show no seasonal changes in regard to these traits, it seems unlikely that they would show seasonal differences in response to the hormones.

In conclusion, the data thus far available indicate that in the male Brewer's blackbird, as in the male English sparrow, the color of the plumage is not subject to modification by the female hormone or by thyroxin. This brings to light another form in which the pattern

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-

* Supported by a grant from the Rockefeller Fluid Research Fund of the Stanford University School of Medicine.

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.