

moderate in 11, mild in 9. In 4 of these it was associated with diseases of the other kidney, as follows: (a) marked contraction and distortion of the renal pelvis possibly of inflammatory origin; (b) marked ptosis; (c) total absence of function; and (d) replacement of the kidney by calcified cysts. The obstructions seemed all to be due to constriction of the ureter at the uretero-pelvic junction. In 5 additional patients hydronephrosis was observed. In one of these marked ptosis of one kidney was present, the other kidney being small and functioning poorly; in a second, a double kidney and mild unilateral hydronephrosis was seen.

2. Renal calculi were seen in the pelves of the kidneys or in their calyces in 5 patients. In one there was also hydronephrosis, and in another, total absence of function in the other kidney.

3. Miscellaneous renal lesions: (a) In 4 patients there was no excretion of diodrast by one kidney on repeated injections, suggesting some interference with renal function on that side; (b) in 2 there was ptosis of one kidney; (c) there was also one case of double kidneys and double ureters; (d) one showing marked distortion of the calyces, possibly a result of old inflammation, and (e) one exhibiting a persistent sharp angulation of the ureter.

Intravenous pyelograms were normal in the remaining 21 patients.

Summary. Abnormalities of the urinary tract, as demonstrated in pyelograms obtained after intravenous injection of diodrast are frequently present in young persons suffering from "essential hypertension." In 50 of 71 patients some abnormality was present. Under these circumstances it seems desirable to explore further the meaning of these phenomena.

10109 P

A New Factor Required for Growth and Reproduction in the Domestic Fowl.

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In an attempt to determine whether or not the chick antidermatosis vitamin (filtrate factor) is required for reproduction in the

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domestic fowl a basal diet was fed composed of 40.65% yellow corn meal, 20% wheat bran, 20% wheat flour middlings, 7% purified casein, 5% soybean oil, 0.5% wheat germ oil, 0.5% cod liver oil, 0.35% liver extract, 3.5% pulverized limestone, 2.0% steamed bone meal, 0.5% salt and a trace of manganese carbonate. The antidermatosis vitamin in the cereal products and the liver extract was destroyed by heating in an oven for 36 hours at 120°C¹ while the casein was freed of the vitamin first by washing repeatedly at pH 2.5 in the presence of sufficient salt to prevent solution of the casein and then by washing at pH 4.7, the isoelectric point of casein.‡ By means of appropriate chemical and biological procedures the heated diet was demonstrated to be adequate in all known vitamins except the antidermatosis vitamin and nicotinic acid.

When the heated diet was fed to hens the percentage hatch of the fertile eggs gradually decreased. The percentage hatch of the fertile eggs of the hens fed the unheated diet, on the other hand, increased somewhat. The results of this work are presented in Table I.

TABLE I.
Effect of Heated Diet upon Reproduction.
(80 hens at start.)

	No. eggs set	No. hatches	% hatch of fertile eggs
Preliminary period			
Unheated diet	666	2	53.1
Depletion period			
Unheated diet	560	6	63.2
Heated "	1076	6	13.9
Experimental period			
Unheated diet	536	7	67.4
Heated " (HD)	328	7	4.5
HD + nicotinic acid	281	7	4.3
HD + antiderm. vit. conc.	370	7	13.2

When the hatchability of the eggs of the hens fed the heated diet reached its lowest point, the hens were divided into 3 groups. One of these groups continued to serve as a control, one was fed nicotinic acid and one was fed a concentrate of the antidermatosis vitamin which had been biologically assayed and found to contain about 25 units of the vitamin per gram.² This concentrate also contained nicotinic acid. No improvement in hatchability was obtained by feeding nicotinic acid at levels of 1.5 mg and 3 mg per hen per day,

¹ Keenan, J. A., Kline, O. L., Elvehjem, C. A., and Hart, E. B., *J. Nutr.*, 1935, **9**, 63.

‡ Unpublished method of Sharpe, P. F., and de Tomasi, J. A., Cornell University.

² Jukes, T. H., and Lepkovsky, Samuel, *J. Biol. Chem.*, 1936, **114**, 117.

amounts in the upper limits of the range reported to prevent black tongue.³ A slight improvement was obtained by feeding the vitamin concentrate at a level of 5%. No further improvement, however, was obtained by increasing the vitamin concentrate to 10%, a level providing 2.5 times as much of the antidermatosis vitamin as is needed to prevent dermatosis in chicks.²

When chicks were fed a heated diet supplemented with the concentrate of the antidermatosis vitamin lesions of dermatosis did not develop but the rate of growth was significantly less than that obtained on the unheated diet even when twice the amount of concentrate required to prevent dermatosis was fed.² The results of this study are presented in Table II.

TABLE II.
Effect of Heated Diet on Growth.
(14 chicks per lot.)

Lot	Treatment	% degree dermatosis	Wt in g at 5 wks.	"t" value of difference between preceding lot*
1	Heated diet (HD)	37.6	89.0	—
2	HD + 1% antidem. vit. conc.	27.4	114.2	2.29
3	HD + 2% " " "	19.7	152.1	3.61
4	HD + 4% " " "	2.8	184.6	2.25
5	HD + 8% " " "	0.0	206.0	2.00
6	Unheated diet	0.0	266.5	5.44

*t = 1.99, odds 19:1; t = 2.64, odds 99:1.

The factor has been found in yeast and in milk as well as in cereals. In the bioassays showing this chicks were fed a diet complete in all known nutritive essentials except riboflavin. When yeast and milk were fed so as to provide 100 γ of riboflavin per 100 g of diet the rate of growth in a number of experiments was significantly greater than that of comparable chicks fed the basal diet supplemented with 100 γ of crystalline riboflavin per 100 g of diet. The rate of growth was also greater than that of comparable chicks fed 250 γ of riboflavin per 100 g of diet, a level of riboflavin together with that in the basal diet sufficient to promote optimum growth, if the diet had been otherwise complete.

It is improbable that any amino acid deficiency exists in the heated diets, since a diet similar to the unheated diet used in demonstrating the presence of the new factor in yeast and milk has been found in protein balance experiments⁴ to promote approximately as great a

³ Elvehjem, C. A., Madden, R. J., Strong, F. M., and Woolly, D. W., *J. Biol. Chem.*, 1938, **123**, 137.

⁴ Wilgus, H. S., Jr., Norris, L. C., and Heuser, G. F., *J. Agr. Res.*, 1935, **51**, 383.

protein retention in growing chicks as any of the other numerous protein combinations studied. It has also been shown that by supplementing heat-treated cereals with casein the biological value of the combination is equal to that of the unheated cereals plus casein.⁵

Conclusions. It is evident from these results and also from the known character of the ration fed that a factor is required for growth and reproduction in the domestic fowl other than vitamins A, B, B₄, B₆, D, E, K, riboflavin, the chick antidermatosis vitamin, nicotinic acid, factor W, the anti-encephalomalacia factor and the essential fatty acids. It appears improbable that this factor is the grass juice factor,⁶ since corn and wheat are reported to be poor sources of the latter factor. It also is improbable that the factor is protein in nature. The factor is destroyed by heating in a dry atmosphere for 36 hours at 120°C. It is present in cereals, yeast and milk.

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Development of the Mesonephros in Amblystoma after Early Extirpation of the Duct.

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The mesonephros in Amblystoma develops from the 9th (or 10th) embryonic somite to the twentieth, at the level of the cloaca. The anterior region, corresponding approximately to segments 10-15, bears the usual relation to the gonad and is the so-called "sexual kidney." The posterior region, more massive and anatomically more complex (due to the presence of secondary, tertiary units, etc.) is the "secretory kidney." Both regions develop from a continuous band of nephrogenic tissue, the "mesonephric blastema" dorso-medial to and contiguous with the primitive kidney duct or pronephric duct. Very early in differentiation the mesonephric units of both regions establish connections with this duct, which thus becomes the mesonephric duct. There is, however, a marked delay in the development of the posterior region, during which the units of the sexual kidney are well developed and functional; and it is to

⁵ Morgan, A. G., *J. Biol. Chem.*, 1931, **90**, 771.

⁶ Kohler, G. O., Elvehjem, C. A., and Hart, E. B., *Wis. Agr. Exp. Sta. Bul.* 439, 1937, 2.