main. The ultraviolet absorption spectrum (Fig. 2) closely resembled that of kynurenine, but it gave a negative Otani's kynurenine reaction (*5*). The ninhydrine, xanthoprotein, and Ehrlich's diazo reactions were positive. The alkaline solution was of a deep-yellowish color and gave a jasminelike odor when heated. Dilute $KMnO_4$ solution also changed the color to deep yellow (urochromogen test of Weiss). The Folin-Denis' uric acid reagent changed the solution to a greenish, and then to a bluish, color. The murexide and lumiflavin tests were negative.

Biological tests employing the mutants vermilion and cinnabar of *Drosophila* were positive.

Addendum: In a previous paper in this journal (*Science*, 1950, **111**, 608) concerning the tryptophan pigments, which dealt with the epidermis pigments of the yellow mutant "lem" of *Bombyx mori*, we reported that the yellow pigment was xanthopterin, but, according to direct comparison with a sample of xanthopterin (kindly sent by E. L. Rickes, Merck & Co., Inc.) it has been found that, although this pigment resembles xanthopterin remarkably closely, it is slightly different. It has been named xanthopterin-B (B from *Bombyx*), and 2 other new pterins have also been isolated (leucopterin-B and a 6-dehydroxyleucopterin derivative) (*6*).

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Built-up Poultry-House Litter as a Growth-promoting Supplement for Chicks on an All-Vegetable Vitamin B_{12}-deficient Diet

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Extensive trials by Kennard and Chamberlin (*1, 2*) at the Ohio Agricultural Experiment Station demonstrated that poultry-house floor litter which has accumulated (built up) for a long period of time gives better chick growth on all-vegetable diets than litter which is completely changed at frequent intervals. Reports have also been made regarding improved hatchability of eggs from hens on such litter (*3, 8*). It has been found that poultry droppings contain the "animal protein factor" (APF) (*7*), and that incubation of hen feces for 72 hr at 30° C stimulates further synthesis of this factor (*4*).

In a series of studies dealing with the synthesis of vitamin B_{12} (now recognized as being an important part of the animal protein factor) by microorganisms in poultry-house litter, marked stimulation of growth was secured by adding built-up litter to an all-vegetable vitamin B_{12}-deficient diet fed to S. C. White Leghorn chicks in a wire-floored battery brooder.

The basal diet used was one consisting principally of soybean oil meal and ground yellow corn supplemented with the known requirements for vitamins, minerals, and the amino acid methionine. The diet was used for studies of soybean oil meal and animal protein factor by workers at the Purdue Agricultural Experiment Station (*5, 6*).

Vitamin B_{12} was shown to be the principal deficiency in the basal diet by the marked stimulation of growth secured by intramuscular injection of a saline solution of crystalline vitamin B_{12} (Cobione)[2] given in the amount of 0.3 μ/g per chick weekly. This injection was as effective in stimulating chick growth as feeding the crude APF supplement[2] containing the equivalent of 20 μ/g of vitamin B_{12}/kg of diet.

As shown in Table 1, addition of 1%, 2.5%, and 5% levels of screened unautoclaved built-up corncob litter (over 1 year old) to the basal diet gave increased chick growth to 6 weeks of 74, 45, and 67 g, respectively, as compared to 84 g for the added APF supplement fed at the rate of 20 μ/g of vitamin B_{12}/kg of diet. The built-up litter used for chick feeding was accumulated from hens that had been fed an all-vegetable vitamin

TABLE 1

EFFECT ON CHICK GROWTH OF ADDING BUILT-UP POULTRY-HOUSE LITTER AND OTHER SUPPLEMENTS TO AN ALL-VEGETABLE VITAMIN B_{12}-DEFICIENT DIET

Diet	No. Trials	Total No. chicks at start	No. died	Avg 6-wk wt in g (all trials)	Feed per g gain
Basal vitamin B_{12}-deficient diet	3	53	8	345	3.78
Basal + APF supplement*	3	53	4	429	3.23
Basal + vitamin B_{12} injections†	1	15	1	426	3.02
Basal + 2.5% ground corncobs	1	15	1	250	5.16
Basal + 5% ground corncobs	1	15	1	265	4.85
Basal + 1% unautoclaved built-up litter	1	18	0	419	3.04
Basal + 1% autoclaved built-up litter	1	18	1	394	3.28
Basal + 2.5% unautoclaved built-up litter	3	53	3	390	3.29
Basal + 2.5% autoclaved built-up litter	2	38	0	466	2.82
Basal + 5% unautoclaved built-up litter	2	27	3	412	3.34
Basal + 5% autoclaved built-up litter	2	35	0	493	2.55

* Twenty μ/g vitamin B_{12}/kg of diet.
† Crystalline vitamin B_{12} (0.3 μ/g/chick weekly).

built-up litter used for chick feeding was accumulated from hens that had been fed an all-vegetable vitamin

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[2] We are indebted to Merck & Co., Inc., Rahway, N. J., through the courtesy of D. F. Green, for the crystalline vitamin B_{12} (Cobione) and the APF supplement (crude vitamin B_{12}) used in these studies.

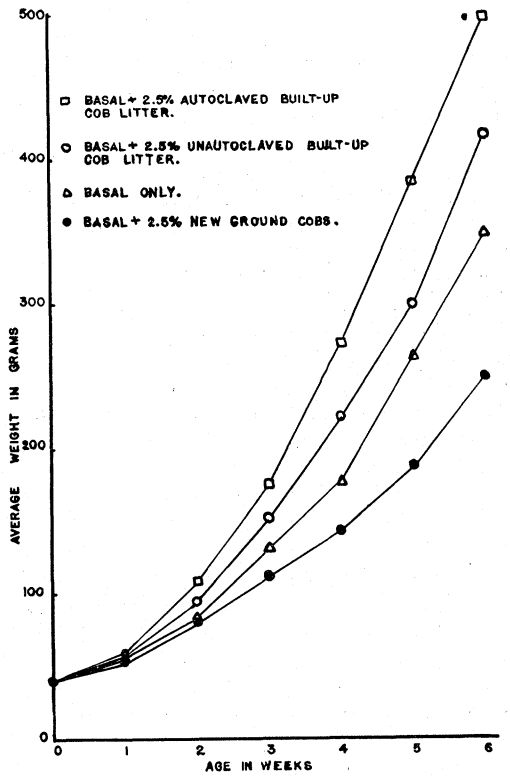

FIG. 1. Chick growth on all-vegetable vitamin B_{12}-deficient basal diet vs. basal plus 2.5% of various kinds of litter.

B_{12}-deficient diet. The autoclaving of this built-up litter for 15 min at 15 lb pressure made it decidedly more effective at the higher levels and produced a growth stimulation of 49, 121, and 142 g for the 1%, 2.5%, and 5% levels, respectively. Addition of ground corncobs to the basal diet, at the rate of 2.5% and 5%, decreased growth by 95 and 80 g, respectively (Fig. 1).

Autoclaving of the built-up litter may release a bound form of vitamin B_{12}, or it may destroy a toxic factor in unautoclaved litter that has a counteracting inhibitory effect on chick growth used at fairly high levels. The increase in growth obtained upon adding 1% of unautoclaved built-up litter as compared to 2.5% tends to support the theory that a toxic factor is present in the litter that has an inhibitory effect on growth, and that this factor is destroyed by autoclaving.

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Preliminary Results on the Crystal Structure of Some Ammonium Salts with Substituted Aliphatic Chains

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Because of renewed interest in the structure of aliphatic compounds, especially amines with straight and branched chains, preliminary investigations have been made upon the normal temperature modifications of the dodecyl-, tridecyl-, tetradecyl-, hexadecyl-, and *n*-methyldodecylammonium chlorides. Dodecylammonium, tetradecylammonium, and hexadecylammonium chlorides are monoclinic, space group $P2_1$ or $P2_1/m$, with $n=2$. Chemical considerations give preference to $P2_1$. Tridecylammonium chloride is orthorhombic, space group $C2ca$ or $Cmca$, with $n=8$. Cell dimensions of these compounds are:

	a	b	c	β
$C_{12}H_{25}NH_3Cl$	5.66 A	7.18 A	17.73 A	92° 30′
$C_{14}H_{29}NH_3Cl$	5.67 A	7.20 A	20.13 A	95° 52′
$C_6H_{33}NH_3Cl$	5.71 A	7.24 A	22.56 A	98° 21′
$C_{13}H_{27}NH_3Cl$	7.57 A	7.61 A	56.49 A	90°

N-methyldodecylammonium chloride is triclinic, space group $P1$, with $n=2$. Cell dimensions are: $a=4.98$ A; $b=5.29$ A; $c=29.92$ A; $\alpha=90°\ 52'$; $\beta=91°\ 52'$; $\gamma=90°\ 45'$.

The Buerger precession camera was used almost exclusively for unit cell and space group determinations. Laue photographs of these compounds, especially dodecylammonium chloride, show strong diffuse reflections which will be further investigated.

Patterson-Harker projections have been completed, and Fourier analyses are under way on molecular configurations and bond lengths.

[1] This work is being carried on under a fellowship sponsored by Armour and Company.

Growth Layers on the Teeth of Pinnipedia as an Indication of Age

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Government biologists engaged in research on the Alaskan fur seal, *Callorhinus ursinus* (L.), in recent years have marked 80,000 young seals by means of hot-iron brands or numbered metal tags. As a result, thousands of animals of known age are now available for study on the Pribilof Islands, in the Bering Sea, where the adult seals gather each summer to breed, and the young seals to rest. While examining the skull of a known-age specimen in 1949 we observed faint concentric ridges around the roots of the teeth. The age of the seal in