TABLE I.
Distribution of C^{14} in Glucose Derived from Starch. % of Total Activity in Various Positions.

				3 and 4 %	2 and 5 %	1 and 6 %
Exp. 1	24	hr of darkness				
	24	" " illumination	with $C^{14}O$	34.3	33	32.7
Exp. 2	72	" " darkness				
	3½	" " illumination	" "	52	25.9	22.1
Exp. 3	72	" " darkness				
	24	" " illumination	" "	47.5	39	13.5
Exp. 4	72	" " darkness				
	48	" " illumination	" "	54.5	25.5	20
Exp. 5	16	" " darkness				
	3	" " illumination	" "	41	37	32
Exp. 6	16	" " darkness				
	3	" " illumination	" "			
		followed by				
	3	" " illumination	" $C^{12}O_2$	14.3	32.7	53

and was permitted to carry on photosynthesis for 3 hours longer. The results obtained, as shown in the Experiments 5 and 6, indicate that the distribution of C^{14} was changed as expected.

There is one other point of interest which appeared from the Experiment 5. A short period of illumination of 3 hours, after an overnight darkness of 16 hours resulted in fairly even but not quite uniform distribution of C^{14}. Like in the sugars produced in photosynthesis initially(3) there was somewhat more activity in 3 and 4 than in 2 and 5 and the least in 1 and 6.

From the results of our experiments we can conclude, therefore, that the distribution of C^{14} in glucose, deposited during photosynthesis as starch, may be affected by the following factors: 1. Duration of the starvation period prior to the illumination. 2. Duration of the illumination period itself. 3. By permitting plants to carry on photosynthesis at first in an atmosphere of $C^{14}O_2$ and then in $C^{12}O_2$.

Summary. It is shown that glucose recovered from starch deposited in photosynthesis in presence of $C^{14}O_2$ may be labelled primarily in 3 and 4 or 1 and 6 positions or evenly in all 6 positions, depending upon the periods of darkness and illumination to which the leaf is subjected.

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Effects of X-Irradiation and Urethane Treatment on Chicken Bone Marrow Enzymes.* (18045)

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Previous work(1,2) has shown that the injection of aminopterin into mature hens results in a leucopenia, reduced bone marrow cell counts, and a loss of bone marrow choline oxidase. It was suggested that the loss of marrow choline oxidase may have been a sig-

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TABLE I.
Effect of X-irradiation and Urethane Treatment on Chicken Bone Marrow Enzymes and on Peripheral Leucocytes.

Treatment	No. of chickens	Oxygen consumption per mg of nitrogen per hr: Endogenous Avg, μl	Endogenous Range, μl	Choline oxidase Avg, μl	Choline oxidase Range, μl	Succinoxidase Avg, μl	Succinoxidase Range, μl	Avg peripheral leucocytes, thousands per μl
Controls	5	16.5	7.2-27.4	3.7	3.0-4.5	9.7	5.6-13.7	29.5
X-ray	5	8.5	6.4-11.2	0.5	0 -1.2	1.0	0 - 2.6	13.1
Urethane	2	16.1	6.0-26.1	1.3	0.6-1.7	5.2	3.5- 6.8	9.4

nificant factor in the leucopenic effect of aminopterin. To investigate further a possible relationship between blood cell formation and marrow choline oxidase, studies have been made on the effects of X-irradiation and urethane treatment on the peripheral leucocytes and bone marrow enzymes of mature hens.

Experimental. Adult hens were exposed to a single whole body irradiation of 300 roentgens (measured on the skin) given over a 32-minute period (375 KV; 5 MA; inherent filtration only; HVL 2.0 mm copper; distance from target to center of animal 123 cm; field size covering entire animal). After exposure hens were killed at intervals of 1, 2, 4, 8, and 17 days. Bone marrow studies were carried out as previously described(2). Since there were no significant differences due to the interval after exposure, only average values and range are given in the table.

One hen was injected intraperitoneally with a total of 5 g of urethane administered at intervals over a 14-day period; another was injected with 1 g of urethane daily for 3 days. The bone marrow was treated as previously described.

The controls were hens of similar size but were given no treatment. All the hens were fed a commercial laying mash.

Results and discussion. The results are presented in Table I. X-irradiation resulted in a marked reduction in endogenous respiration, choline oxidase, and succinoxidase. Urethane injection did not reduce endogenous respiration, but reduced choline oxidase to one-third of control values. Succinoxidase was also reduced by urethane treatment but not as markedly as was choline oxidase. Both urethane and X-rays rendered the birds leucopenic.

The effects of X-irradiation on the enzymes cannot be fully explained. However it has been suggested that X-irradiation inactivates sulfhydryl groups(3) and it is known that both choline oxidase and succinoxidase depend on intact sulfhydryl groups for activity(4,5). The mechanism whereby urethane inhibits choline oxidase is not known; it has been found not to be strictly competitive in nature(6).

Summary. Mature hens were given a single whole body X-irradiation of 300 roentgens. This treatment markedly reduced the bone marrow endogenous respiration, choline oxidase, and succinoxidase. The intraperitoneal injection of urethane also reduced marrow choline oxidase, and reduced succinoxidase but to a lesser degree. Both X-irradiation and urethane treatment rendered the chickens leucopenic.

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