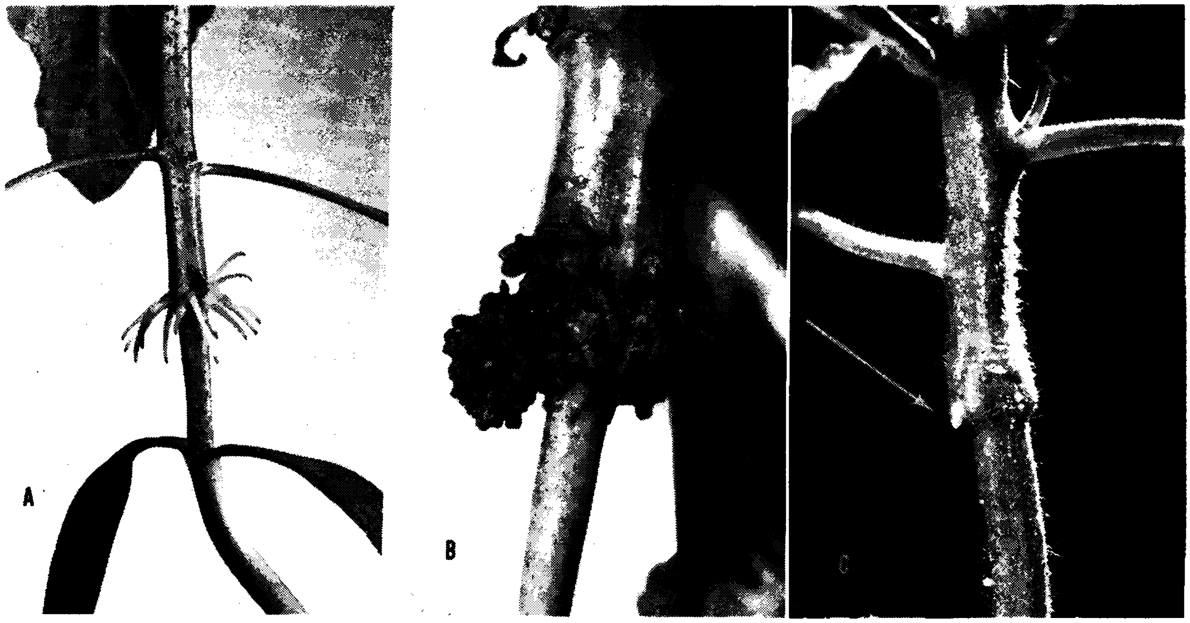

FIG. 1. A. *Xanthium*, 29th postradiation day (1500 r) roots evoked by 3 days of high humidity. B. *Xanthium*, 90th postradiation day (3000 r) ultimate root development without high humidity. C. *Lycopersicum*, 27th postradiation day (24,000 r); arrow indicates young root in swollen region above irradiation site.

The rooting response has been studied chiefly in cocklebur (*Xanthium* sp.). It does not occur at dosages of 1000 r or less but does result unfailingly in all plants receiving 1500 r to 12,000 r. A stem sector of *Xanthium* irradiated with such an effective dosage shows no visible effect for about 2 wks, when a slight chlorosis of the irradiated zone appears. At about 3 wks, the irradiated zone is decidedly narrower than the regions above and below it, apparently because growth is slower there than in the unirradiated parts of the stem. Some swelling occurs in the untreated part of the stem immediately above the irradiated area. In the fourth postradiation week, the swollen region displays small papules which develop into normal roots if a sufficiently humid environment is provided (Fig. 1A). The plant may be air-layered or kept in a moist hood to evoke the roots on the intact plant, or it may be decapitated through the irradiated region and handled as a rooted cutting. Roots will develop sufficiently in a few days, in any of these cases, to support the plant independently.

If the plant is not subjected to high humidity as described, the young rootlets will be produced in greater numbers but will stop growth and become suberized at a length of a few mm. The ultimate development of such growth is shown in Fig. 1B.

Other species and the dosages which have produced rooting in this manner are: *Nicotiana glauca*, 6000 r; *Lycopersicum esculentum*, 24,000 r (Fig. 1C); *Phaseolus* sp., 16,000 r. No lower limits of effectiveness have been determined for these species.

The mechanism of this response is being investigated. The gross aspect of the plant suggests that a phloem block occurs at the radiation site which impairs downward transport beyond that point. An accumulation of the organic materials carried by the phloem would thus occur above the irradiated area. This could readily explain the swelling which takes place, as well as the induction of roots from the swollen region. At the same time, the upward transport of water through the radiation site seems unaffected, since the plant above this area displays no signs of wilting. Localized irradiation, as described, did not seem to interfere with height growth during the time required to produce the adventitious roots.

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Antithyroid Action of Antibiotics[1]

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The significant increase in body weight of poultry and swine following the addition of minute amounts of antibiotics to their normal diets has served to bring into prominence the role of antibiotics in animal nutrition (*1–4*). It was considered of interest to com-

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[2] On military leave of absence.

pare the action of antibiotics and thiouracils under identical conditions on the thyroid gland.

A colony of immature white rats, approximately 45 days old, was divided into 5 groups of 4 animals each. The groups received the same basic diet (Pratts Nurishmix with 1% iodized salt). Exclusive of the control, each group received their drug by blending it into the ground food in the following concentrations: aureomycin or potassium penicillin G, 1 mg/kg; iodothiouracil (Itrumil) or propylthiouracil, 2%.[3] The animals were permitted to eat ad libitum for 42 days and were weighed weekly. A dose of 20 μc I^{131} was injected iv into these animals exactly 48 hours before the conclusion of this experiment. Following this, the rats were sacrificed, the radioactive count obtained, and the thyroids studied histologically.

It was observed that the thyroid/total body weight ratio as well as the uptake of I^{131} compared favorably (Table 1). All the test groups showed an increase in

TABLE 1.

	Comparative size of thyroid glands (% total body wt. $\times 10^{-6}$), av.	Uptake of I^{131} by thyroids (cpm/mg tissue)	
		Av.	% control
Control	1.94 ± 0.48	543 ± 47	100
Potassium penicillin G	3.73 ± 0.51	149 ± 41	27.4
Aureomycin	7.63 ± 1.03	115 ± 23	21.1
Itrumil	23.5 ± 4.8	0.7 ± 0.2	0.12
Propylthiouracil	41.5 ± 7.9	58 ± 16	10.6

size of the thyroid and a marked depression of the uptake of I^{131}. However, the changes induced by the antibiotics were not as great as by the thiouracils. Histologically, in one of the aureomycin-fed rats, there was evidence of hyperplasia; no changes were observed in the penicillin-fed group. In addition, the vascularity after Itrumil was far less than after propylthiouracil thus confirming the observations of other investigators (*5*).

In our observations, there is suggestive evidence that aureomycin and potassium penicillin G have a goitrogenic action which simulates the thiouracils. It is of major interest to note that it has been suggested that pharmacologically thiouracils disturb uracil metabolism (*6, 7*) and that penicillin disturbs nucleic acid synthesis (*8*). Although limited data have been presented, there is evidence that aureomycin and potassium penicillin G inhibit thyroid activity as measured by the uptake of I^{131} and the weight of this gland.

[3] We wish to thank the Ciba Pharmaceutical Products, Inc., for their generous supply of Itrumil, and Wyeth, Inc., for the potassium penicillin G.

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Production of Triuret from Uric Acid by Ultraviolet Irradiation[1]

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As part of a program involving the relation of the chemical and biological effects of the irradiation of nucleic acid derivatives (*1, 2*), uric acid has been irradiated with ultraviolet light. This paper deals with the production in this manner of triuret, which is not known to be produced under physiological conditions.

Two-liter portions of uric acid solution in water (0.1 mg/ml, pH adjusted to 6.5) were irradiated at room temperature for 2 hr in large white enamel pans by batteries of 7 G.E. germicidal lamps placed about 1 cm above the surface of the solution. The specific ultraviolet absorption spectrum of uric acid had completely disappeared by that time. The solution was concentrated *in vacuo* at 35–40° C and placed in the refrigerator. A yellow crystalline precipitate was formed which was filtered off and recrystallized four times from boiling water. The substance crystallizes in colorless leaflets. It is insoluble in ether and chloroform, sparingly soluble in cold water and ethanol, and soluble in alkalis, acids, and boiling water. It does not show an ultraviolet absorption spectrum. On heating in 1*N* NaOH solution, ammonia is liberated. The substance has the following composition: C, 25.00%; H, 4.09%; N, 38.49%.[3] This checks well for an empirical formula of $C_3H_6N_4O_3$: C, 24.5%; H, 4.1%; N, 38.4%. This and the solubility characteristics suggested to us that the substance might be triuret (1,3-dicarbamylurea):

$$CO\begin{cases} NH—CO—NH_2 \\ NH—CO—NH_2 \end{cases}$$

The melting point of the substance after prolonged drying in high vacuum at 50° C is 237° C when determined in a sealed capillary tube. This is in good accord

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[3] All analyses were carried out by C. Tiedcke, Teaneck, N. J.