which should be beneficial in counteracting the deleterious effects of irradiation.

Male CF 1 strain mice, weighing an average of 20 g, were arranged in groups of 20 animals each and maintained under the same conditions used in our previous radiation studies (*6*). The water-soluble vitamin E solutions and control saline were injected intramuscularly in total daily doses of 0.1 ml of the concentrations given in Table 1. Injections were given prior to irradiation and every day thereafter until 90–100% of the animals had died. The 550-r irradiation dose was administered from above and below the mice with two 250 KVP Picker Industrial Units operating simultaneously. The technical factors were: 250 KVP; 15 ma; FOD 100 cm; filters 0.21 mm Cu inherent, 0.5 mm Cu parabolic, and 1.0 mm Al; HVL, 2.02; size of field-total body, r/min measured in air 17.37–17.53. Both units were calibrated prior to the experiment with a Victoreen thimble r-meter. The results obtained were analyzed statistically by the method of Litchfield (*7*).

The results obtained are given in Table 1. It is evident that the lower doses of vitamin E neither significantly increased nor decreased the ST_{50} day or the day of total mortality, whereas the two highest doses significantly decreased both. These results indicate that even when this antioxidant is made available to the animal prior to irradiation and throughout the post-irradiation period, it does not prevent the deleterious effects of ionizing radiation. The doses used should have been adequate, because Polister and Mead (*3*) showed that *in vitro* 2.69×10^{-5} *M* tocopherol would prevent radiation-induced oxidation of 2.56×10^{-2} *M* methyl linoleate. The fact that the higher doses of vitamin E increased both the rate of mortality and the total mortality would indicate that the vitamin acted synergistically with the radiation. This confirms Mead's (*8*) observation with fat-soluble vitamin E in rats. Such effects indicate that the extensive biochemical derangements which occur in the radiated animal may make otherwise nontoxic doses of essential metabolites a contributing factor in lethality from radiation. It is also possible that even water-soluble vitamin E does not reach the site of peroxide action, and thus the peroxides are not prevented from exerting their deleterious effects. On the other hand, peroxide formation is only one effect produced by radiation, and therapy designed to counteract only one damaging effect might not prevent over-all radiation damage.

TABLE 1. Effect of water-soluble vitamin E in irradiated mice.

Drug	Total daily dose (mg)	ST_{50}* and range (days)	Slope and range	Total mortality (Days)	Total mortality (%)
Saline 0.9%	—	8.35 (7.3–9.5)	1.35 (1.2–1.5)	12	90
B-883 Vitamin E based on 25.5%	0.5	9.4 (8.6–10.3)	1.23 (1.15–1.31)	11	100
α-Tocopherol content	1.0	7.95 (7.2–8.7)	1.24 (1.16–1.33)	11	95
	2.0	5.8 (5.5–6.13)	1.13 (1.08–1.17)	8	100
	3.18	4.21 (3.9–4.5)	1.19 (1.13–1.26)	6	100

* ST_{50} = day on which 50% of animals remain alive. Values are at odds 19/20.

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Root Production in Plants Following Localized Stem Irradiation[1]

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This paper reports the induction of adventitious roots in *Xanthium, Nicotiana, Lycopersicum,* and *Phaseolus* following localized irradiation of a small length of the stem of the intact seedlings.

Adventitious roots have been produced artificially in the past in a number of intact plants as a response to various external treatments. The use of auxin pastes is well known. Ethylene, propylene, and acetylene have also been used to produce roots on the stems of *Lycopersicum, Tagetes, Nicotiana, Hydrangea,* and *Coleus* (*1*). Carbon monoxide has produced the same effect in *Cosmos, Impatiens, Amaranthus,* and other plants (*2*). Root development on bean cotyledons followed planting of the seed in soil treated with 2-4-D (*3*). Johnson, using x-rays, reported some increased rooting in *Salix* cuttings but concluded that radiation was harmful to the rooting of herbaceous cuttings (*4*).

The present study was conducted with seedling plants exposed to 250 KVP, 30 ma x-irradiation with 1 mm Al filtration. Lead shielding 2 cm thick was placed so as to protect all plant parts except the short length of stem to be irradiated. The epicotyl and hypocotyl respond similarly to this treatment; no distinction was made between these regions in selecting the site of treatment. Cotyledons were often included in the exposure.

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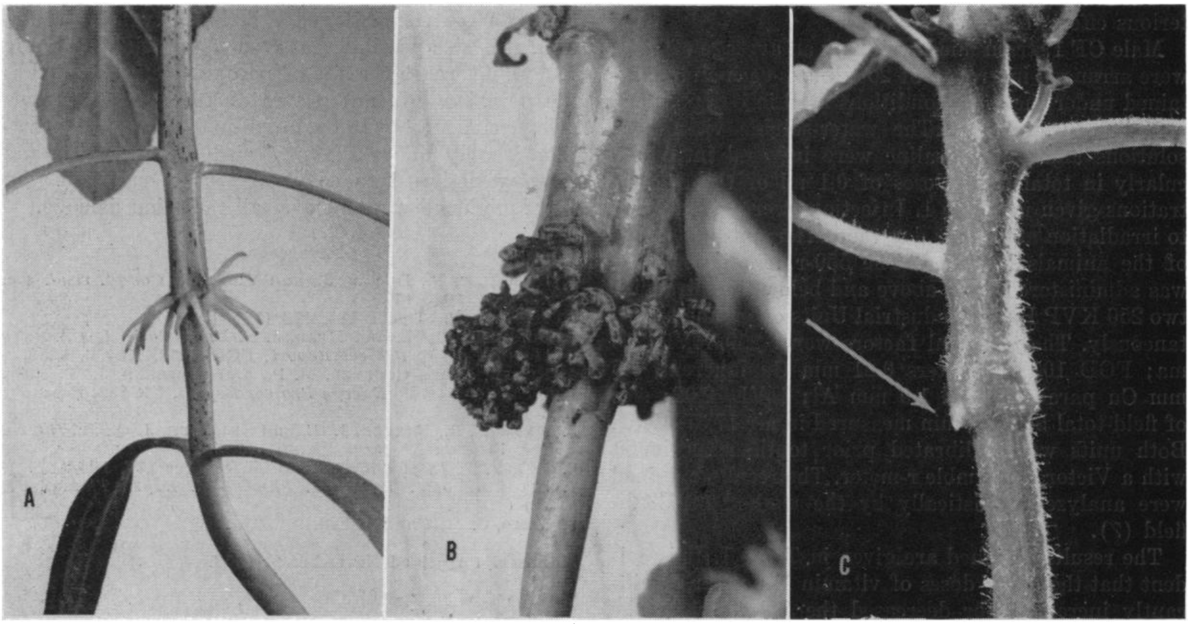

FIG. 1. A. *Xanthium,* 29th postradiation day (1500 r) roots evoked by 3 days of high humidity. B. *Xanthium,* 90th postradiation day (3000 r) ultimate root development without high humidity. C. *Lycopersicum,* 27th postradiation day (24,000 r); arrow indicates young root in swollen region above irradiation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