with tocopherol or by using rations with a vegetable shortening as the main source of fat. This vegetable shortening (Vream) is rich in tocopherol. An equally significant drop in the rate of early mortality was seen in rats receiving rations very low in fat. In general, rations containing yeast enabled rats to live longer—at least beyond the arbitrary two-day limit—than rats fed similar rations without yeast.

Hemoglobinuria was *never* observed in rats fed rations rich in tocopherol. On the other hand, a varying, but often high proportion of the experimental rats kept on rations free from, or very low in, tocopherol showed hemoglobinuria after intraperitoneal injection of alloxan. Here again, supplements of methionine or high protein-high lard diet were, in the absence of tocopherol, without any appreciable effect on hemoglobinuria. Supplements of choline, however, seemed to have a slight but definite beneficial effect on hemoglobinuria. Addition of yeast to the ration was followed in most instances by a reduction of hemoglobinuria. The yeast rations with high protein or with low fat were exceptions and did not decrease the incidence and intensity of hemoglobinuria.

Hemoglobinuria was accompanied by intravascular hemolysis and a rapid fall in the red blood cell count, occurring almost immediately, with a peak a few hours after injection of alloxan. Here are a few examples of the changes in red blood cell count:

Before alloxan	8.8, 7.4, 7.6, 8.5, 7.5, 7.5 million/mm^3
After "	1.9, 4.0, 1.0, 2.9, 1.7, 2.7 " "

In the past only Kennedy and Lukens (*7*) mentioned hemolysis as a complication of diabetes in rabbits. They implied that hemolysis and diabetes are closely related. In our observations, early mortality and hemoglobinuria (hemolysis) occurred independently from diabetes. The dietary factors, such as tocopherol or yeast, or a ration low in fat, which in our experience reduced the rate of early mortality and hemoglobinuria, had no influence on the incidence and intensity of diabetes. Thus, the pharmacological-toxicological action of alloxan seems to be based on two independent components, one being responsible for the hemolysis, the other for the diabetes. The preventive effect of tocopherol and related dietary factors on hemolysis caused by alloxan requires further elucidation.

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Growth and Fruiting of Tomato Plants as Influenced by Growth-regulating Substances Applied to the Soil[1]

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Hormones are used today for numerous purposes, including killing of weeds, thinning of blossoms, checking fruit drop, and increasing fruit set in various plants. Their application to flower clusters has been effective in increasing the fruit set of tomatoes during winter days of low light intensity in the north and also in hastening the maturity of the early summer crop. The addition of these growth regulators directly to the soil and their subsequent effect on the fruiting of plants does not seem to have received adequate attention. Zimmerman and Hitchcock (*6*) reported that "one to five mgms of 2.5-dichlorobenzoic acid per 4 inch pot of soil caused fruit set of flowers and buds present when the chemical was applied to the soil. It also caused parthenocarpic development of flower buds which were initiated after the soil was treated."

The following preliminary experiments were conducted in late spring of 1948 in the greenhouse with a view to studying the effect of application of various hormones to the soil on the growth and fruiting of the tomato plant. Seed of Valiant variety of tomatoes was sown on January 16, 1948; the seedlings were transplanted in flats 2″ × 2″ apart. Vigorously growing, uniform plants were transferred to 12″ pots on March 29. They were divided into 4 groups on April 16, when 2–3 flowers on the first cluster of most of the plants had opened. Aqueous solutions of hormones were applied as follows:

Treatment No. 1—	50 ppm	*o*-chlorophenoxyacetic acid, 100 cc thrice, at weekly intervals.
" No. 2—	50 ppm	α-*o*-chlorophenoxypropionic acid, 100 cc thrice, at weekly intervals.
" No. 3—	100 ppm	2,5-dichlorobenzoic acid, 100 cc twice, at weekly intervals.
" No. 4—		Check.

The general appearance of the treated plants was not much affected except in the case of those treated with *o*-chlorophenoxyacetic acid. These were yellowish-green and comparatively weak, resembling plants infected with virus mosaic. Their top growth was significantly poorer than the ones treated with α-*o*-chlorophenoxypropionic acid and 2,5-dichlorobenzoic acid (Table 1).

Although there was no statistically significant difference between root weight of different groups of plants, the data tend to indicate that there was some stimulation of root growth in the case of plants treated with α-*o*-chlorophenoxypropionic acid.

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The average weight per fruit, harvested before July 1, for all hormone treatments taken together was 166 gm as compared with 93 for the check. This difference is statistically significant. However, when the different hormone treatments are considered separately, it is found that only treatment No. 3 had significantly larger fruit size than the check. This seems to be due to high experimental errors because of 4 replications only. The weight of the fruits was decreased in the case of plants treated with α-*o*-chlorophenoxypropionic acid and 2,5-dichlorobenzoic acid after July 1 (Table 2).

TABLE 1

TOP AND ROOT GROWTH OF PLANTS AS INFLUENCED BY DIFFERENT TREATMENTS (Mean per Plant)

Treatment No.	Tops (oz.) (fresh wt.)	Roots (gm) (dry wt.)
1	19.5	11.1
2	30.25	15.7
3	28.0	10.5
4 (check)	25.5	10.3

TABLE 2

MEAN YIELD PER PLANT AND AVERAGE FRUIT WEIGHT UNDER DIFFERENT TREATMENTS (GM)

Treatment No.	Mean yield per plant	Fruit size up to July 1	Fruit size after July 1
1	1.489	147	157
2	1,592	154	104
3	1,669	196	133
4 (check)	1,549	93	101

The total yield of the plants did not seem to be influenced to any appreciable degree under these conditions.

The fruits harvested from different treatments were cut and tasted. Those treated with α-*o*-chlorophenoxypropionic acid and 2,5-dichlorobenzoic acid were rich red and more meaty than untreated ones. They were adjudged as sweeter and richer in flavor than the ones treated with *o*-chlorophenoxyacetic acid and check. However, there appeared in all the treated groups some fruits with a greenish jelly-like substance, which was not considered very desirable from the appearance point of view. There were no misshapen fruits or fruits with unfilled locules on treated plants, as are sometimes obtained when tomato blossoms are sprayed with hormones.

The first one or two fruits on each plant contained seeds, while those which matured after that were seedless. This indicates that flowers fertilized before the application of hormones to the soil developed seed and that growth in others was affected by the hormones. In these latter it may be that the pollen was rendered ineffective or that abnormal development of the ovules started before fertilization could take place. This parthenocarpic development of the fruits reveals that the hormones were absorbed by the roots and were transported through the stem to other aerial parts, (*2*, *3*, *5*).

As there were several buds on the first and second cluster at the time of application of hormones which developed into seedless fruits, it does not necessarily follow that only those buds initiated after application of hormones develop parthenocarpically, as has been suggested (*6*). The presence of seeds in the young fruits observed on July 5 shows that the hormones lost their effect within 7–8 weeks. It is possible that they were leached out of the soil, absorbed and fixed by soil colloids, or decomposed and thus rendered ineffective. This is further supported by the decrease in average fruit weight of plants treated with α-*o*-chlorophenoxypropionic acid and 2,5-dichlorobenzoic acid after July 1 (Table 2). DeRose (*1*) found 2,4-dichlorophenoxyacetic acid in leachate. Even when leaching was prevented, it was inactivated within 68–80 days, while 2,4,5-trichlorophenoxyacetic acid retained its effectiveness for a much longer period. However, Nutman, Thornton, and Quastel (*4*) reported that 2,4-dichlorophenoxyacetic acid, when applied to the soil, lost its toxicity within 3–6 days.

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Early Maturation of Calimyrna Fig Fruits by Means of Synthetic Hormone Sprays

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Maturation of Calimyrna fig fruits in approximately 60 days instead of the average 120-day period necessary for normal fruit development to maturity has been accomplished as a result of spraying unpollinated but pollen-receptive syconia with solutions of 2,4,5-trichlorophenoxyacetic acid. The fruits thus formed were comparable in size and color to mature, pollinated (caprified) fruits. Although completely devoid of achenes ("seeds"), the hormone-produced fruits were well filled with pulp and quite palatable.

These results were obtained as part of a research program initiated in 1947 and aimed at developing a commercially feasible method of setting parthenocarpically the syconia of the Calimyrna fig, a variety that requires cross-pollination for fruit development to maturity (*1*). This preliminary work showed that a spray of indole butyric acid at 1,500 ppm was effective in setting parthenocarpic fruit. As a continuation of the program this season, a number of other synthetic auxins