The results of the preliminary test indicate that the acetic acid, when alone or in combination, offers promise as a safe and effective tomato seed soak for the control of bacterial canker. Further studies to establish limits of concentration and effective schedules for the treatment are in progress.

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VITAMIN B_1 AND THE SYNTHESIS OF FAT FROM CARBOHYDRATE

IN recent years it has become clear that vitamin B_1 is concerned with carbohydrate metabolism. Professor R. A. Peters[1] has ably reviewed the evidence which substantiates this belief, and he has provided a theory for the action of the vitamin in preventing or curing polyneuritis. As stated by Peters, "This vitamin is a catalyst used by the tissue at some stage in the combustion of carbohydrate. Defect in this stage within the central nervous system will lead readily to convulsions."

The theory of the action of vitamin B_1 as defined to date is, then, that carbohydrate metabolism proceeds to the pyruvic acid stage but is there halted in the absence of vitamin B_1. In the presence of the vitamin the pyruvic acid is oxidized and energy production from carbohydrate is normal in amount. Emphasis has been placed upon the action of vitamin B_1 as a catalyst necessary for the combustion of carbohydrates. There is no doubt that the vitamin permits the oxidation of pyruvic acid by brain tissue *in vitro* and the explanation may be completely satisfactory for that tissue. More recent evidence has indicated that the vitamin has as a principal function in the body generally the synthesis of fat from carbohydrate.

Whipple and Church[2] have shown that the main factor in the weight increases due to vitamin B_1 in rats is the laying down of fat, and, in their experiments, the only possible source of this fat was the dietary carbohydrate. Further evidence was provided by them[3] in measurements of respiratory quotients that carbohydrate is transformed into fat under the influence of vitamin B_1. The writer has confirmed[4] the production of fat from carbohydrate in the presence of the vitamin.

At this stage an hypothesis regarding the action of vitamin B_1 might be advanced, based, it is true, upon incomplete evidence. Whether or not the vitamin is supplied, it has been generally accepted that carbohydrate metabolism proceeds to the pyruvic acid stage. In the absence of the vitamin pyruvic acid accumulates as has been shown in pigeons, rats and in human subjects by a number of workers. In the presence of the vitamin fat is synthesized, presumably with pyruvic acid as an intermediary stage between carbohydrate and fat, although this is as yet unproven. It has long been felt that this possibility exists and recently Krebs and Johnson have shown[5] that hydroxy butyric acid can be formed from pyruvic acid by tissues.

This hypothesis, which attempts to correlate various pieces of published evidence, is that vitamin B_1 is necessary for the synthesis of fat from carbohydrate. It does not weaken the belief that vitamin B_1 is concerned with carbohydrate metabolism but alters the conception of the vitamin being a factor in energy production from carbohydrate to a broader view of carbohydrate utilization. An explanation is suggested for the disappearance of pyruvic acid when vitamin B_1 is supplied to avitaminous birds or animals and for the laying down of fat under such conditions. Furthermore, the action of dietary fats in sparing vitamin B_1 might be through provision of the body with necessary fat which on diets poorer in fat would be synthesized by the animal from carbohydrate with the help of vitamin B_1.

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THE EXPERIMENTAL PRODUCTION OF INTERSEXUALITY IN THE FEMALE RAT WITH TESTOSTERONE

IN a previous report[1] the observations of Hain[2] on the production of hypospadias in the female offspring of the rat by the injection of the mother with estrone,[3] before or immediately after birth, have been confirmed. We have now found that estradiol[3] injected into the mother (2.0–3.0 mg) antepartum or into the *new-born* female (0.2–0.4 mg) also produces hypospadias. The male offspring were apparently not influenced. On the basis of embryological facts, it was suggested[1] that the hypospadias was due to an hypotrophic defect. This immediately suggested the idea that testosterone[3] when given to the pregnant rat might (a) cause hypospadias in the male offspring, or (b) produce an arrest of the development of the vagina in the female, or (c) produce intersexuality (free-martin) in the female. These latter two possibilities have now been shown to be true.

1 R. A. Peters, *Lancet*, 230: 1161, 1936.
2 D. V. Whipple and C. F. Church, *Proc. Amer. Soc. Biol. Chem.*, 30: cvii, 1936.
3 Whipple and Church, *ibid.*, 31: ciii, 1937.
4 E. W. McHenry, *Jour. Physiol.*, 89: 287, 1937.
5 H. A. Krebs and W. A. Johnson, *Biochem. Jour.*, 31: 645, 1937.
1 R. R. Greene, *Proceedings Soc. Exp. Biol. and Med.*, 36: 503, 1937.
2 A. M. Hain, *Quart. Jour. Exp. Physiol.*, 25: 131, 303, 1935; *ibid.*, 26: 290, 293, 1936.
3 We desire to thank Dr. Oliver Kamm, of Parke, Davis and Company for the estrone, and Dr. E. Schwenk, of the Schering Corporation, for the estradiol and testosterone used in this work.