These data suggest that HMF in pure solution may be, at least in part, converted by high voltage cathode rays into a compound or compounds having an absorption maximum at 265 mμ, one of which may be levulinic acid. The formation of the resulting compound or compounds does not proceed from the other three homologues of HMF when they are irradiated. A similar shift in absorption maximum was noted when browned dried fruit extracts were irradiated by high voltage cathode rays.

Levulinic acid has an extinction coefficient one thousandth that of HMF. If the compound absorbing at 265 mμ were solely levulinic acid, it would appear from these data that there was not sufficient HMF present to account for all the levulinic acid and that some of the levulinic acid must have been formed by the action of cathode rays from other compounds in the solution.

Although HMF may be associated with the brown color in dried fruits, it is reasonable to assume that, upon irradiation, it is converted irreversibly into a compound that absorbs maximally at 265 mμ, probably levulinic acid. Yet upon standing, most of the color returns. This confirms previous suggestions (*5*) that other as yet unidentified compounds may share the responsibility for the nonenzymatic browning of dried fruits.

Further experiments using supervoltage cathode rays as a tool for the investigation of chemical changes in foods are currently in progress.

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Pyrolysis of Diphenyl Disulphide and the Formation of Free Radicals containing Univalent Sulphur

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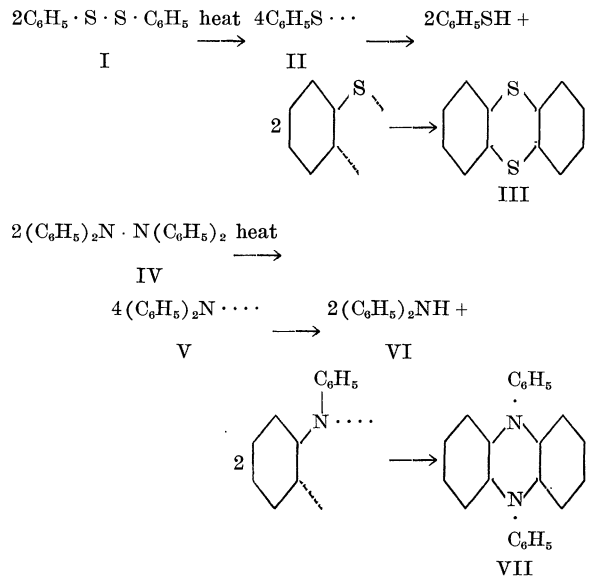
Contrary to views previously accepted (*1*), it has been pointed out by Schönberg (*2*) that diphenyl disulphide (I) and related substances are capable of forming free arylthial radicals in hot solutions (cf. I $\rightleftharpoons$ 2 II). The cracking of diphenyl disulphide has now been investigated and carried out in the absence of a solvent and of oxygen in such a way that the reaction products of lower boiling point were allowed to distill off during the thermal decomposition (288° bath temperature; six hr). From diphenyl disulphide (5.5 g) an oily distillate was obtained which had the properties of thiophenol and yielded its benzoyl derivative (1.95 g) when treated with benzoyl chloride in the presence of alkali. The contents of the reaction vessel solidified and after recrystallization, diphenylene disulphide (thianthrene—III) was obtained. The thermal decomposition of diphenyl disulphide follows the same principle (disproportionation) as that which is operative in the case of tetraphenyl hydrazine (*3*) (IV) leading to the formation of diphenyl amine (VI) and diphenyl dihydrophenazine (VII).

This analogy is a further indication that diphenyl disulphide forms free radicals at high temperature (II) as do the tetraarylhydrazines (cf. V).



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Nicotinic Acid as a Growth Factor for Certain Orchid Embryos

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The problem of possible symbiotic relationships between orchids and their naturally occurring mycorrhizal symbionts has been under dispute ever since Knudson (*6*) cultured orchid embryos on an aseptic agar, inorganic salt, and sucrose medium in the absence of any fungus. However, Knudson (*7*) agreed with Bernard (*2*) and Burgeff (*3*) that orchid embryos attained better development when cultured with the mycorrhiza. Yet since this association was not absolutely essential, he believed symbiosis was doubtful.