chief discrepancy between atomic weights determined by physicochemical methods and those obtained from mass-spectrographic data.

We expect to continue work on this problem.

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THE HABER-WILLSTÄTTER CHAIN MECHANISM OF ORGANIC AND ENZYMATIC PROCESSES

Sir:

Haber and Willstätter [*Ber.*, **64**, 2844 (1931)] have proposed chain mechanisms for a number of organic and enzymotic processes of which we may cite the oxidation of alcohol as typical. Their reaction scheme is

$$CH_3CH_2OH + \text{Enzyme} = CH_3\dot{C}H(OH) + \text{Mono desoxy-enzyme} + H \quad (a)$$

$$CH_3\dot{C}HOH + CH_3CH_2OH + O_2 = 2CH_3CHO + H_2O + OH \quad (b)$$

$$OH + CH_3CH_2OH = CH_3\dot{C}HOH + H_2O \quad (c)$$

A similar chain can be set up for aldehyde oxidation. We have attempted to verify such a mechanism, starting the chain of processes at stage (c) by decomposing hydrogen peroxide photochemically in mixtures of alcohol and oxygen suitably agitated. We find that the photo-decomposition of peroxide markedly sensitizes the interaction of alcohol and oxygen. The oxidation process is a chain reaction, sensitive to inhibitors but the chain length is short. It is much shorter than the assumed chain length ($\sim 10^5$) in the communication of Haber and Willstätter. Dilute aqueous aldehyde solutions behave similarly and the chain length is somewhat longer. The detailed results will be communicated immediately.

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ORIENTATION IN THE FURAN NUCLEUS

Sir:

The introduction of an aldehydic group into 3-methylfuran, by means of hydrogen cyanide and hydrogen chloride, results in the formation of 3-methyl-2-furfural [Reichstein, Zschokke and Goerg, *Helv. Chim. Acta*, **14**, 1277 (1931)]. The nitro-β-methylfuran obtained from 3-methylfuran by the action of fuming nitric acid in acetic anhydride has been shown to be 3-methyl-2-nitrofuran [Rinkes, *Rec. trav. chim.*, **49**, 1125 (1930)] by comparison with an authentic specimen kindly provided by Dr. I. J. Rinkes.

The 3-methylfuran was synthesized by the following sequence of reactions: 3-furoic acid ⟶ 3-furoyl chloride ⟶ 3-furaldehyde ⟶ 3-furaldehyde-hydrazone ⟶ 3-methylfuran. It readily forms a chloromercuri compound (3-methyl-2-furylmercuric chloride) which melts at 142°, and such mercurials are recommended as satisfactory derivatives for the characterization of many furan compounds, including those with an α-carboxylic group [*Rec. trav. chim.*, **51**, 1054 (1931), and **52** (March) (1933)].

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THE EFFECT OF WATER ON THE PHOTOSYNTHESIS OF HYDROGEN CHLORIDE

Sir:

In the last few months several papers have questioned the necessity of having water vapor present in order to bring about the photochemical union of hydrogen and chlorine in visible light [Rodebush and Klingelhoefer, THIS JOURNAL **55**, 130 (1933); Kimball and Eyring, *ibid.*, **54**, 3876 (1932); Allmand and Craggs, *Nature*, **130**, 927 (1932)]. Coehn and Jung [*Z. physik. Chem.*, **110**, 705 (1924)] reported several years ago that the reaction would not proceed if the water vapor pressure was reduced below 10^{-7} mm., and the maximum rate was not attained unless the water vapor exceeded 10^{-5} mm. In order to test this observation it is obvious that great care must be taken to prevent the accidental entry of sufficient water to cause the reaction to go. The most certain method is to carry out the experiments with the entire reaction vessel at such a temperature that the equilibrium value for the water vapor pressure is within the desired limits. We have performed such experiments at various temperatures between 145 and 200°K. and we find no evidence of the falling off in the rate such as reported by Coehn and Jung. If we had confirmed their results, there should have been a marked decrease in the rate between 160 and 177°K. In a recent note Baker [*Nature*, **131**, 27 (1933)] claims to have demonstrated the effect of water on this reaction as a lecture experiment. As he used phosphorus pentoxide to dry his gases the results he observed must have been due to inhibitors introduced by this reagent. We feel that our results show definitely that water vapor has no effect on the rate of photosynthesis of hydrogen chloride.

In our experiments the reaction vessel was a Pyrex glass bulb placed in a lead block provided with a Pyrex window. This ensemble was suspended in a Dewar vessel and cooled by means of liquid air and a cold air blast. Resistance thermometers wound on the reaction vessel and