

the liquid asymmetrical tetrachlorodioxane, described by Butler and Cretcher, a crystalline hexachlorodioxane and more highly chlorinated derivatives which are under investigation. More properties of the isomeric naphthodioxanes have been determined and the inquiry has been enlarged to include the derivatives with 1,3-propanediol, pyrocatechol, benzyl alcohol, ester of tartaric acid, etc. By treatment with potassium acetate we made and investigated the diacetate. We are very much astonished that our first communication, intended *inter alia* to save double work, has apparently been understood as an invitation to continue our research. After this explanation we think it will be clear that we ourselves will continue our research in all directions. The results obtained since our last article will be communicated in the near future.

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THE REACTION OF CARBOXYLIC ACIDS WITH PHOSPHORUS PENTOXIDE

Sir:

Certain aliphatic ketones have been made by the action of phosphorus pentoxide with acids [Gal and Étard, *Compt. rend.*, **82**, 457 (1876); Kipping, *J. Chem. Soc.*, **57**, 532, 980 (1890); **63**, 452 (1893)]. An attempt to apply this reaction to trimethylacetic acid gave no ketone nor carbon dioxide but instead gave carbon monoxide and polymers of isobutylene. *n*-Butyric and isobutyric acids with excess of phosphorus pentoxide gave both carbon dioxide and carbon monoxide and formed tars. The yields and ratios of these gases were determined.

Acid	% Yield of CO and CO ₂	Ratio CO : CO ₂
<i>n</i> -Butyric	7	1:5
Isobutyric	10	5:1
Trimethylacetic	60	∞

Use of xylene as a solvent for the first two acids cut the yields of gas to 0.07 and 0.14%, respectively, but did not change the ratio of CO:CO₂. No gas was evolved when benzoic acid was treated in boiling xylene with an excess of phosphorus pentoxide.

This process is being studied as a possible means of distinguishing tertiary aliphatic acids from other types of acids.

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