

of dry solid ammonium bromide. When these reactions were carried out under suitable conditions, the corresponding colorless trisubstituted methane was found to be optically active. In one experiment a specific rotation $[\alpha]_D^{20}$ in acetone -11.7° was obtained. Since this methane derivation was obtained in an optically active condition it follows that the colored sodium triarylmethyl must have been active. Hence the three groups and the central carbon atom of the ion could not have been in a plane.

The optical stability of such an ion is being investigated further and a discussion of these results will be published at a later date.

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FREDERIC H. ADAMS
EVERETT S. WALLIS

OXIDATION COLORS DERIVED FROM 5,6-DIAMINOURACIL

Sir:

Ortho-, meta- and para-diamines differ in their behavior toward oxidizing agents, such as hydrogen peroxide, as follows. With ortho-diamines two molecules react to form a diaminophenazine. With para-diamines two or more molecules react to form a quinone-anil of the type of Bandrowski's base. Meta-diamines, however, do not react. Nevertheless, in the presence of an ortho- or para-diamine (which is capable of forming an ortho- or para-quinoid derivative on oxidation), meta-diamines do react to form deeply colored substances which have found application in fur and hair dyeing.

We find that 5,6-diaminouracil (an ortho-diaminopyrimidine) is also capable of reacting with meta-diamines, aminophenols and diphenols, in the presence of hydrogen peroxide, to form colored substances which dye animal fibers. Thus, for example, the following colors have been obtained from this pyrimidine: with *m*-phenylenediamine, purple; with *m*-aminophenol, old rose; with resorcinol, salmon.

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MARSTON TAYLOR BOGERT
DAVID DAVIDSON

THE CONCENTRATION AT WHICH HEATS OF DILUTION ARE MEASURED IN THE CALORIMETRIC METHOD: A CORRECTION

Sir:

In a recent letter [THIS JOURNAL 54, 4114 (1932)] we objected to certain of the claims made by E. Lange and A. L. Robinson based upon the extrapolation of their calorimetric data for intermediate heats of dilution

to the reference state of infinite dilution. We have since discovered that our communication was based upon an interpretation of their procedure which is erroneous, namely, that a separate extrapolation was made for each pair of solutions in order to determine the heat content of the solution at each final concentration. Instead, only the value for the lowest final concentration depends entirely upon extrapolation; the values for the heat content of all other recorded concentrations being obtainable by *alternately adding* and *subtracting* the measured values for the intermediate heats of dilution. Our objections to their procedure are consequently without foundation.

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VICTOR K. LA MER
I. A. COWPERTHWAIT

ROTENONE. XXIV. SYNTHESIS OF TETRAHYDROTUBANOL

Sir:

As has been shown recently [Haller and LaForge, *THIS JOURNAL*, **53**, 4460 (1931); **54**, 1988 (1932)], tubaic acid ($C_{12}H_{12}O_4$), obtained from rotenone by the action of alcoholic potash, is converted by drastic catalytic hydrogenation into tetrahydrotubaic acid ($C_{12}H_{16}O_4$). When heated to its melting point, tetrahydrotubaic acid loses carbon dioxide and yields a crystalline product, tetrahydrotubanol ($C_{11}H_{16}O_2$), which has been identified as an alkyl resorcinol. Previous work on rotenone and its derivatives indicated that the side chain is an isoamyl group. It was suggested that tetrahydrotubanol is 2,6-dihydroxy-1-isoamylbenzene. This compound has now been synthesized and found to be identical with tetrahydrotubanol. The synthesis was accomplished by the following set of reactions. 2,6-Dimethoxybenzotrile [Lobry de Bruyn, *Rec. trav. chim.*, **2**, 210 (1883)] was allowed to react with isobutylmagnesium bromide and the resulting ketimine was hydrolyzed to 2,6-dimethoxyphenyl isobutyl ketone. The ketone was reduced to 2,6-dimethoxy-1-isoamylbenzene, which on demethylation yielded 2,6-dihydroxy-1-isoamylbenzene. A comparison of its physical and optical properties with those of tetrahydrotubanol showed them to be identical. Experimental details will be presented in an early paper.

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