in this reaction. The effects of various concentrations of procaine hydrochloride on streptomycin solutions are shown in Fig. 2. The color of these solutions was intensified as the concentration of procaine hydrochloride was increased.

Since procaine hydrochloride upon hydrolysis forms *p*-aminobenzoic acid (5), solutions of streptomycin sulfate containing either 2% procaine hydrochloride or an equimolar quantity of *p*-aminobenzoic acid were comparatively evaluated. It has been reported that caffeine complexes with procaine (6) and *p*-aminobenzoic acid (7). Accordingly, the effect of caffeine on the color formation of these solutions was also investigated. The results are summarized in Fig. 3 and show that *p*-aminobenzoic acid has a more adverse effect upon the color stability of streptomycin solutions than does procaine hydrochloride. The addition of caffeine in no way affected the color formation of these solutions.

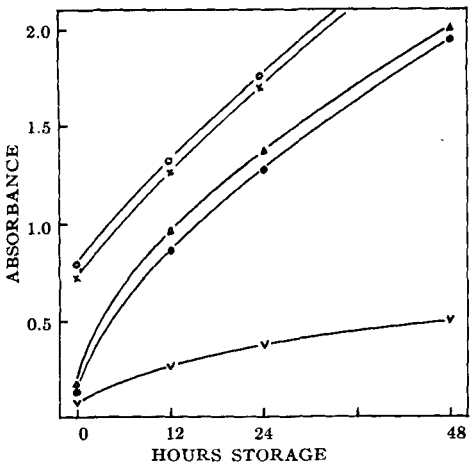

Fig. 3.—Effect of *p*-aminobenzoic acid, procaine hydrochloride, and caffeine on streptomycin color formation. ∨, Streptomycin; ●, streptomycin and 2% procaine hydrochloride; △, streptomycin, 2% procaine hydrochloride, and 2.0% caffeine; x, streptomycin and PABA; ○, streptomycin, PABA, and 2% caffeine.

To determine whether the carbonyl group of streptomycin was involved in this color reaction, dihydrostreptomycin was studied, since in this compound the carbonyl group is reduced to an alcohol. Upon the addition of procaine hydrochloride, tetracaine hydrochloride, or *p*-aminobenzoic acid to solutions of dihydrostreptomycin, no color was formed under accelerated conditions, thereby indicating that the carbonyl group of streptomycin was the active color-forming moiety involved in this reaction.

SUMMARY AND CONCLUSIONS

A study of the color reaction between procaine hydrochloride and streptomycin sulfate has shown that the darkening of this mixture beyond the normal colorless to light yellow color of a streptomycin solution was due to an interaction between the *p*-amino group of the procaine and the carbonyl group of the streptomycin. If the *p*-amino group was substituted as in the case of tetracaine hydrochloride, or absent as in lidocaine hydrochloride, or the carbonyl group reduced as in dihydrostreptomycin, this color formation did not occur under the conditions of this experiment.

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Book Notices

Instrumental Methods for the Analysis of Food Additives. Edited by William H. Butz and Henry J. Noebels. Interscience Publishers Inc., 250 Fifth Ave., New York 1, N. Y., 1961. viii + 288 pp. 15 × 23 cm. Price $11.

Timely and useful information is presented in this book. The text is divided into four major parts under the headings: Introduction, Sampling and cleanup, Identification, and Analytical procedures. The introduction is a 41-page coverage of the Food Additive Petition and discussions of the Food Additive Amendment and how to operate with it. An index is included.

The Fire of Life. By Max Kleiber. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16, N. Y., 1961. xxii + 454 pp. 15 × 22.5 cm. Price $11.50.

An introductory textbook on animal energetics, this book aims to present the fundamental concepts (i.e., heat, latent heat, chemical energy, etc.) and their basic relationships. The book title indicates that the text is essentially limited to the classical rather than the newer aspect of metabolism and nutrition. The text is divided into six parts under the headings: Evolution of bioenergetics, Total starvation, Physical aspect of metabolism, Metabolism of the starving animal, Food as fuel, Food and population. Practice problems and an index are appended.

Carbon-14 Compounds. By John R. Catch. Butterworth Inc., 7235 Wisconsin Ave., Washington 14, D. C., 1961. vii + 128 pp. 14 × 21.5 cm.

Intended as a guide to the literature and not as a practical textbook nor a comprehensive index of C^{14}-compounds, this book touches on: The production of C^{14}, Chemical synthesis, Biological methods of labeling, Peculiar features of C^{14}-compounds, Analysis, Measurement of C^{14}, and Precautions in the use of C^{14}-compounds.