Claisen flask. At the end of this time the mixture was distilled under reduced pressure. Water came over first and then 31.4 g. (71%) of *m*-bromopropenylbenzene boiling at 108–114° at 16 mm. was obtained. This was dissolved in 100 cc. of ethanol and reduced in a Burgess–Parr reducing outfit with hydrogen and 0.1 g. of platinum oxide catalyst.[1] The reduction was complete in two and one-half hours. The mixture was filtered and distilled. There was thus obtained 27 g. (85%) of *m*-bromo-*n*-propylbenzene boiling at 96–100° at 17 mm.; $n^{20}{}_D$ 1.5354.

Anal. Calcd. for $C_9H_{11}Br$: Br, 40.15. Found: Br, 40.19.

***m*-Bromo-*n*-butylbenzene.**—Using the same general procedure 74 g. of *n*-propyl bromide and 92.5 g. of *m*-bromobenzaldehyde gave 71 g. of *m*-bromobutenylbenzene boiling at 126–130° at 22 mm.; which on reduction yielded 59 g. of *m*-bromo-*n*-butylbenzene, b. p. 113–116° at 18 mm.; $n^{20}{}_D$ 1.5330.

Anal. Calcd. for $C_{10}H_{13}Br$: Br, 37.51. Found: Br, 37.50.

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[1] Adams, Vorhees and Shriner, "Organic Syntheses," Coll. Vol. I, John Wiley and Sons, Inc., New York, N. Y., 1929, p. 452.

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RECEIVED MARCH 19, 1941

n-Heptylsulfonylacetic Acid

The reaction of sodium chloroacetate with the sodium mercaptide from 25 g. (0.17 mole) of *n*-heptyl mercaptan was carried out in the same way as described[1] for the reaction of butyl mercaptan. The α-(*n*-heptylthio)-acetic acid was liberated by the addition of a solution prepared by dissolving 40 ml. of concentrated sulfuric acid in 180 ml. of water. The oil was separated and the aqueous layer extracted with ether. The combined water-insoluble layers were dried over anhydrous sodium sulfate and the ether removed by distillation. The residue was dissolved in 90 ml. of a mixture of glacial acetic acid-acetic anhydride (1:1) and oxidized with 43 g. (0.38 mole) of 30% hydrogen peroxide under the conditions previously[1] described. After removal of the solvent under reduced pressure the residue was crystallized from ether. The yield was 35 g. (83%) m. p. 90–91°. Recrystallization from water gave large glistening laminae of *n*-heptylsulfonylacetic acid, m. p. 95.5–96° (cor.).

Anal. Calcd. for $C_9H_{18}O_4S$: S, 14.42. Found: S, 14.54, 14.59.

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[1] Pomerantz and Connor, THIS JOURNAL, **61**, 3144 (1939).

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RECEIVED MARCH 11, 1941

COMMUNICATIONS TO THE EDITOR

THE CARBOHYDRATE IN COLLAGEN

Sir:

It has been reported by Grassmann and Schleich [*Biochem. Z.*, **277**, 320 (1935)] that the carbohydrate complex of collagen contains glucose and galactose in equimolecular proportions. In connection with a determination of the amount of carbohydrate in samples of collagen that were being investigated, an attempt was made to destroy the sugar in hydrolyzed collagen by fermentation with yeast. It was found that the sugar was not fermentable with a galactose-active yeast. When *d*-galactose and yeast were added to samples of the hydrolyzate, the added sugar was destroyed and the sugar from the collagen remained. These experiments give conclusive proof that neither *d*-glucose nor *d*-galactose forms a considerable part of the carbohydrate in collagen. The presumption is that the sugar is a mixture of *l*-glucose and *l*-galactose, but it has not been established that this is the case. It is significant in this regard that Bell and Baldwin [*Nature*, **146**, 559 (1940)] recently found *l*-galactose as a component of a polysaccharide of animal origin.

NATIONAL BUREAU OF STANDARDS
WASHINGTON, D. C.
JOHN BEEK, JR.

RECEIVED APRIL 8, 1941

THE ISOLATION OF PURE LINOLEIC ACID BY CRYSTALLIZATION

Sir:

The only method previously available for the preparation of linoleic acid which is pure as evaluated from its iodine number is that of debromination of pure tetrabromostearic acid. However, Matthews, Brode and Brown[1] have shown that the debromination acid may contain 12% of an isomeric linoleic acid. When this contaminating acid is removed by repeated low temperature crystallization, the resultant product melts nearly 2° higher than any specimen of linoleic acid so far reported.

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[1] Matthews, Brode and Brown, THIS JOURNAL, **63**, 1064 (1941).