

and was purified by passing through a solution of caustic potash, over hot copper gauze and finally over solid caustic potash.

After the nickel had been once reduced by heating at 300° for eight hours in a current of hydrogen, it was necessary to heat again to 300° for one hour each time it was used. The apparatus was then placed in an oil bath at 160 – 180° and the nonylene allowed to drop very slowly (about 6 drops a minute) through the dropping funnel on to G. The nonylene was vaporized and carried by the current of hydrogen entering at A over the nickel in F and out at E where it was condensed by an air condenser.

The nonylene was completely saturated by running it once through the apparatus. The nickel was found to work better if after running a few drops of liquid through the apparatus the first time the nickel was used, the process was stopped, heated up to 300° for an hour and then continued again at 160° . It was also found that the same nickel could not be used for two different substances.

Ten grams of the nonylene gave nine grams of the 2,5-dimethylheptane boiling within one degree. It gave no test for unsaturation. This 2,5-dimethylheptane was fractionated until 4 grams were obtained boiling at 135.6 – 135.9° under 760 mm. pressure.

Calculated for C_9H_{20} : C, 84.37; H, 15.63
Found: C, 84.12; H, 16.14

Properties: Colorless liquid with a petroleum-like odor, boiling at 135.6 – 135.9° under 760 mm. pressure. The specific gravity at 15° is 0.7190 referred to water at 15° . The index of refraction was determined with a fine Pulfrich refractometer, $N_D(25^{\circ}) = 1.4020$. The hydrocarbon is fairly miscible with the common organic solvents.

CAMBRIDGE, MASS.

[CONTRIBUTION FROM THE CHEMICAL LABORATORY OF HARVARD COLLEGE.]

2,4-DIMETHYLHEPTANE.

BY LATHAM CLARKE AND SYDNEY A. BEGGS.

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This nonane has been synthesized and studied in connection with the researches in this laboratory on the paraffin hydrocarbons.

In the synthesis of 2,4-dimethylheptane, the starting point was ethyl isopropylacetoacetate, which was saponified giving methyl isobutylketone or 2-methyl-4-pentanone. The plan then was to treat the ketone with normal propyl magnesium iodide, which was expected to give an alcohol containing nine atoms of carbon, 2,4-dimethyl-4-heptanol, $CH_3CH_2CH_2C(OH)(CH_3)CH_2CH(CH_3)_2$; the last we intended to convert into the corresponding carbinol iodide, and by then splitting off hydriodic acid by the action of alcoholic potash, the nonylene would be formed

and dried over potassium carbonate, the ether was then distilled off and the residue consisting of the nonylene fractionated. The yield was twenty grams of hydrocarbon boiling at 132–133°.

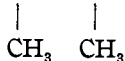
Calculated for C_9H_{18} : C, 85.71; H, 14.29

Found: C, 85.29; H, 14.22.

Properties: Colorless liquid boiling at 132–133°.

Miscible with all the common organic solvents. Immiscible with water. Decolorizes bromine in chloroform solution. It has an odor like that of petroleum.

2,4-Dimethylheptane, $CH_3CH_2CH_2CHCHCHCH_3$, was made from the



nonylene by reducing it by Sabatier and Senderens' method of passing the vapor of the nonylene with an excess of hydrogen over freshly reduced nickel at 160–180°, after the manner of the reduction of 2-methyl-5-metheneheptane to 2,5-dimethylheptane described in the preceding paper. The nonane was then carefully fractionated with a fifth degree thermometer until five grams were obtained boiling at 132.9–133°.

Calculated for C_9H_{20} : C, 84.37; H, 15.63

Found: C, 84.28; H, 15.92

Properties: Colorless liquid boiling at 132.9–133° at 752 millimeters pressure. It is miscible in the common organic solvents. Does not decolorize bromine in chloroform. Odor of petroleum. Sp. gr. is 0.7206 at 15° compared to water at 15°. The index of refraction was determined with a Pulfrich refractometer $N_D(25^\circ) = 1.4014$.

CAMBRIDGE, MASS..

October, 1911.

[CONTRIBUTION FROM THE CHEMICAL LABORATORY OF THE UNIVERSITY OF ILLINOIS.]
MOLECULAR REARRANGEMENTS IN THE CAMPHOR SERIES. VIII.
CAMPHONOLIC ACID AND CAMPHONOLACTONE.

BY WILLIAM A. NOYES, E. E. GORSLINE AND R. S. POTTER.

Received November 23, 1911.

Three lactones are known which correspond to three hydroxy acids which retain the tertiary carboxyl of camphoric acid. These are:

1. Campholactone, obtained by Fitting and Woringer¹ in distilling lauronolic acid and formed when lauronolic acid is warmed with dilute acids.

2. Isocampholactone, first obtained in an impure condition by one of us² in decomposing aminolauronic acid,

¹ *Ann.*, 227, 10.

² *Am. Chem. J.*, 17, 432; 32, 290.