retical potassium hydroxide dissolved in the least possible amount of water. The water was distilled out of the solution in an insulated boiling flask. The flame was then turned off and 80% of the theoretical amount of monochloro-2,7-dimethyloctane (based on the potassium hydroxide used) was dropped into the potassium cresolate at such a rate that the temperature (thermometer well in liquid) did not rise above 180°. The decylene distilled off as formed. The product was washed, dried and fractionated. Approximately six kilograms of decylene, boiling from 155–166° and representing a yield of 91.6% of the theoretical were thus obtained.

After a second fractionation, 90% of the principal fraction boiled between 159.6 and 162.8° (A. S. T. M. D 216); f. p. −79.5°; d_4^{20} 0.7418; n_D^{20} 1.4250.

A number of modifications of the described technique were tried. Each of these variations materially reduced the yield of the olefin.

Preparation of Decadiene

Direct treatment with potassium cresolate gave a poor yield in the case of dichloro-2,7-dimethyloctane (b. range 121–125° at 12 mm.; density at 20°, 1.0091; chlorine, by analysis 34.09%, theoretical 33.60%). On the other hand, long-continued boiling with a very large excess of alcoholic potash removed only one molecule of hydrochloric acid but gave a satisfactory yield of the chloro olefin. If the two methods were combined, a good yield of the diolefin was obtained. A chloro-2,7-dimethyloctene was obtained by refluxing the dichlorodimethyloctene with one and one-half moles of alcoholic potash (25% solution) for three hours. The chloro olefin was then treated with potassium cresylate by the method described above. It had a tendency to distil over unchanged and repeated treatment was necessary. The middle 90% of the carefully purified and fractionated product boiled over the range 161.0–166.0° at 764.4 mm.; f. p. −92.6°; d_4^{20} 0.7627; n_D^{20} 1.4410.

Both hydrocarbons were free from chlorine. The number of isomers present or the position of the double bonds was not established for either hydrocarbon. The decylene is apparently largely the 2,7-dimethyloctene (2), b. p. 159–162°, of Kishner.[3]

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[3] Kishner, *Chem. Zentr.*, II, 725 (1900).

UNITED GAS IMPROVEMENT CO.
PHILADELPHIA, PENNA.
RECEIVED APRIL 10, 1934

COMMUNICATIONS TO THE EDITOR

ISOBARIC ISOTOPES

Sir:

The recent publications of most scientists on the subject of isotopes imply that a given atom does not have an isobaric isotope.[1] However, it has been known for more than a decade that Uranium X_2 and Uranium Z[2] are not only isotopes but also isobars.

This example seems to indicate that, within the nucleus, the protons and negatrons or other units not only do not lose their identity completely but actually give rise to nuclear isomerism. If this hypothesis is correct, we should expect that isobaric isotopes should be as numerous as isomerism in the case of compounds. As yet, we have no means of showing the existence of such isotopes in the case of the non-radioactive elements but it is conceivable that the different isobaric isotopes may show differences in artificial disintegration or in artificial radioactivity recently discovered by the Joliots and confirmed by Lord Rutherford.

In all probability, these isomeric nuclei may have different energies of formation from protons and negatrons or other units and, if we accept the current hypothesis of the interconvertibility of mass and energy, may have slightly different atomic weights.

The symbols recently suggested by Harkins [*Science*, **79**, 138 (1934)] for distinguishing isotopes would be identical, and hence useless, for isobaric isotopes. A perfect system of symbols for distinguishing isotopes has, therefore, not yet been devised.

CHICAGO, ILLINOIS HERBERT J. BRENNEN
RECEIVED MAY 31, 1934

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(1) The word "isobar" is used in the generalized sense, namely, for "atoms, the atomic weights of which may differ by small fractions of a unit."

(2) See, for example, Rutherford, Chadwick and Ellis, "Radiations from Radioactive Substances," New York, 1930, p. 24.

THE PEROXIDE EFFECT IN THE ADDITION OF REAGENTS TO UNSATURATED COMPOUNDS

Sir:

In a recent issue of THIS JOURNAL, Sherrill, Mayer and Walter [THIS JOURNAL, **56**, 926 (1934)] claim that the important factor governing addition of hydrogen bromide to pentene-1 is the solvent and not the peroxide content of the reaction mixture. In view of their report we have