a maximum over-all quantum yield of 2 if our mechanism is correct, or of 1 if that of Ross and Kistiakowsky is right. The fact that the values of Ross and Kistiakowsky are less than unity at 3650 and somewhat exceed it at 3130 lends probability to the correctness of our theory.

If this view is not taken it is difficult to reconcile the low value of the quantum efficiency at λ 3650 Å. with the diffuse character of the absorption in that region. It is improbable that the fraction of excited molecules which do not decompose could lose their energy by collision for this would involve a life of the excited state of the order of 10^{-8} second, which is about 10^5 times greater than that necessary to produce so diffuse a spectrum.

LABORATORY OF PHYSICAL CHEMISTRY
UNIVERSITY OF CAMBRIDGE
CAMBRIDGE, ENGLAND
RONALD G. W. NORRISH
H. GORDON CRONE
OLIVE D. SALTMARSH

RECEIVED JUNE 7, 1934

THE ADDITION OF HYDROGEN BROMIDE TO PENTENE-1 AND HEPTENE-1

Sir:

In reply to the communication by Kharasch, Hinckley and Gladstone in which they question the validity of our conclusions concerning the importance of the solvent as an influencing factor in hydrogen bromide addition to pentene-1 and heptene-1, we would emphasize the particular conditions under which our addition reactions were carried out. The highly purified hydrocarbons gave no test for peroxide before the addition of hydrogen bromide nor did they give the colored reaction mixtures which we have always obtained in hydrogen bromide addition to hydrocarbons known to contain peroxide. The addition reactions in organic solvents, where we obtained the so-called "abnormal" products, 1-bromopentane and 1-bromoheptane, took place in the absence of air, whereas in water solution the reaction mixtures were shaken for many days in contact with air. The probability of a peroxide effect in the latter solvent is therefore much greater than in the organic solvents but our results gave conclusive evidence of the formation of only the "normal" product 2-bromopentane and 2-bromoheptane in water solution. Careful analysis of the experimental data would seem to justify our conclusion that any peroxide effect was eliminated in these reactions.

Furthermore, our reactions were carried out at atmospheric pressure while those of Kharasch and co-workers must have taken place under increased pressure. This factor complicates any comparison of results since the effect of pressure may be of importance in determining the products of the reaction. In drawing conclusions from our experiments there was no intentional disregard of the importance of the peroxide effect in hydrogen halide addition to unsaturated compounds which has been demonstrated by Kharasch and co-workers. Our results, however, seem to give conclusive evidence that in the absence of peroxide the solvent is an influencing factor.

CHEMICAL LABORATORY
MOUNT HOLYOKE COLLEGE
SOUTH HADLEY, MASSACHUSETTS
MARY L. SHERRILL

RECEIVED JUNE 11, 1934

PREPARATION OF PURE METALLIC HYDROXIDES

Sir:

A recent article by J. H. Long, J. C. W. Frazer and Emil Ott [THIS JOURNAL, **56**, 1101 (1934)] refers to a dissertation by O. G. Bennett [Johns Hopkins University, 1930] which describes the purification of metallic hydroxides by washing the oxides (or hydroxides) by decantation until peptization occurs and then electrodialyzing to remove the alkali salts adsorbed by the oxide hydrate at the moment of precipitation and which cannot be removed from the (usually gelatinous) oxide by mere washing. This ultra-purification is necessary if one is to obtain cobalt or nickel trioxides or manganese dioxides in a state sufficiently pure so as to be capable of catalyzing the reaction of carbon monoxide with oxygen at room temperature.

According to Bennett's dissertation, which was kindly made available by Dr. J. C. W. Frazer, the process of electrodialysis is long and tedious, sometimes requiring weeks. If the oxide could be precipitated in the absence of alkali or metal compound other than manganese or nickel salts, respectively, it would not be necessary to remove adsorbed salts by electrodialysis. It has been found in this Laboratory that passing ozone through neutral solutions of manganous acetate or chloride precipitated a manganese oxide which, after a short washing with concentrated nitric acid and drying by evacuation at 100°, was a very active catalyst for the oxidation of carbon monoxide. The electrolysis of manganous nitrate