2/2 units) and, in fact, accounts for the spin in all the cases considered by Bartlett. However, these cases will also fit into a scheme in which the electrons have no spin, and the proton spins behave like ordinary electron spins (Bartlett, *loc. cit.*). Both proposals will meet with difficulties in the case of Al (Gibbs and Kruger, *loc. cit.*). I think we must simply admit that we do not know how the spins in nuclei are produced. In the meantime, speculations regarding nuclear structure, such as Latimer's, which are based on other data, are of interest.

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THE PREPARATION OF COPPER-CHROMIUM OXIDE CATALYSTS FOR HYDROGENATION

Sir:

The new and very efficient catalyst for the hydrogenation of various organic compounds in the liquid phase [Adkins, Connor and Folkers, THIS JOURNAL, **53**, 1091, 1095 (1931)] referred to as "copper chromite" suffers under the disadvantage that in the hydrogenation of certain compounds (ethyl phenylacetate to phenylethyl alcohol, for example), there occurs reduction of the catalyst to a red inactive compound. This undesirable feature is not present in a modified catalyst containing barium, for example, which was prepared by replacing 10% of the copper nitrate with a molecularly equivalent amount of barium nitrate using 750 ml. of water at 70° per mole of nitrate. The preparation of a copper–chromium catalyst as originally described by us was based upon the method patented by Lazier for obtaining catalysts from certain chromates. Recently it has been found in this Laboratory that an equally if not more efficient copper–chromium catalyst may be prepared by a more convenient and simple method which is as follows. Seventy-one grams of ammonium carbonate monohydrate in 400 ml. of water was added to a solution containing 50 g. of copper nitrate trihydrate, 5.4 g. of barium nitrate and 77 g. of chromium nitrate ($Cr_2(NO_3)_6 \cdot 15H_2O$) in 575 ml. of water. After thorough mixing of the reactants, the precipitate was filtered with suction on a Büchner funnel, and washed twice with 50-ml. portions of water. The solid was dried overnight at 100–110°, ground to a powder and heated to approximately 230° in order to expel ammonia, carbon dioxide, etc. The catalyst was then used as previously described.

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