If this be the case, then it is equally fair to assume that any solvent taken will not dissolve substances of identical composition from different asphalts.

A review of the results here given suggests the query, have the methods heretofore employed for the technical analysis of asphaltum really been analytical at all? Would not a method and process suggested by the results of the qualitative analyses given in this paper and based on the successive application of different solvents and yielding results similar to those of fractional distillation really become analytical, especially if the separate portions dissolved by the different solvents were subjected to such treatment by oxidizing agents as would enable us by a comparison of the products of oxidation to determine to what groups of hydrocarbons the different substances dissolved respectively belong?

I take pleasure in hereby acknowledging my indebtedness to the courtesy of Hon. Thos. R. Bard, President of the Union Oil Co., of California, for the use of the laboratory of the company while engaged in this research.

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ACTION OF METALLIC MAGNESIUM UPON MANGANOUS SALTS.

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THE statements relating to the action of metallic magnesium upon solutions of manganous salts are contradictory; thus Manck (Ueber d. Verh. d. Magnesium und Aluminum gegen Salzlösungen, Goettingen, *1862*) states that metallic manganese is readily precipitated by magnesium from neutral solutions of manganous nitrate or chloride. Phipson (*Jahresb.*, *1864*, 192) corroborates this and remarks that the manganese separates as a regulus. The observations of Roussin (*Jahresb.*, *1866*, 170), Comaille (*Comptes Rendus*, **63**, 556; *Jahresb.*, *1866*, 171), and Kern (*Chem. News*, **33**, 236), on the other hand, seem to demonstrate that metallic manganese is not thrown out of manganous salts by metallic magnesium.

We have tried the action of the last metal on manganous salt solutions, both in the presence of alcohol and ether. In using these liquids, our aim was to reduce the liability of oxidation of manganese, if any should appear, to a minimum.

Experiment 1.—In this trial magnesium acted upon aqueous manganous chloride in the presence of alcohol for a period of two hours. At the expiration of this time the liquid was distilled off, and the material remaining was then carefully analyzed. 0.2582 gram substance was used for this purpose. It showed the presence of 0.0284 gram of chlorine, 0.1392 gram of magnesium, and 0.0539 gram of manganese, or a total of 0.2215 gram.

Experiment 2.—In this, both ether and alcohol were added to the solution upon which the magnesium acted. After removal of the liquids the residue was dried in an atmosphere of nitrogen. 0.6530 gram of it showed the presence of 0.0993 gram of chlorine, 0.3059 gram of magnesium, and 0.1865 gram of manganese, or a total of 0.5917 gram. The action of the magnesium in this instance was only continued through one and a half hours.

Experiment 3.—The conditions here were practically the same as those in experiment 2. The substance was dried, as there, in an atmosphere of nitrogen. Upon analyzing 0.7120 gram of the dry residue it revealed the presence of 0.2302 gram of chlorine; 0.2339 gram of magnesium, and 0.1779 gram of manganese.

In these three trials, as in others which were made, the sum total of the constituents of the reaction product, obtained by analysis, is less than the quantity of material taken for analysis, indicating that, in all probability, it is not metallic manganese which is precipitated by magnesium, but rather, a hydrated oxide, as was suggested by Kern, who used a saturated solution of manganous chloride, and allowed metallic magnesium to act upon it for a period of six to eight hours, with this result:

$$3MnCl_2 + 3Mg + 3H_2O = 3MnO + 3MgCl_2 + 3H_2,$$

and in the presence of water the manganous oxide passes into the protosesquioxide.

Metallic manganese thrown out by the electric current, oxidizes rapidly on momentary contact with the air, and even if it should come down as metal, through the action of magnesium, it is scarcely probable that, in the finely divided state in which it would be, it could long resist the action of the surrounding water.

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