certainly $2K_2RuCl_5.3H_2O$, the difference in behavior on chlorination might possibly be explained.

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The Isomeric Ruthenium Chlorides.—The statement in the recent paper of Howe and Haynes[1] that "Briggs considers that the normal alpha salt is a monohydrate, $K_2RuCl_5.H_2O$, in which the ruthenium has a coördination number of **6**," was based on a misunderstanding of his paper. He there states:[2] "It is evident that the coördination number of ruthenium is greater than 6 in the compound $2K_2RuCl_5.3H_2O$." It was wrongly assumed that in $K_2RuCl_5.H_2O$ he considered the number to be 6, as would naturally be expected. There is no reason for assuming a higher coördination number for ruthenium in this compound. On the other hand, the anhydrous form, K_2RuCl_5, which seems undoubtedly to exist, would call for a coördination number of 5.

With Briggs' conclusion that "no deductions with regard to the formula of any individual preparation can be drawn with safety unless *every* constituent is directly estimated during analysis," I should heartily agree, if the sentence were qualified by writing it "no *complete* deduction." In practically all of our recent analyses of the halo-ruthenium salts, we have heated the salt in hydrogen, recovering the evolved halogen in silver nitrate solution. Thus, for example, in the analysis of $K_2RuCl_5.H_2O$ ("aquo" salt), $2KCl + Ru$ is left in the boat, and Cl_3 collected as silver chloride. There can be no more water than is indicated by loss, and as this has in no case amounted to $1^1/_2$ H_2O, we have been unable to accept Briggs' formula, $2K_2RuCl_5.3H_2O$, for the "aquo" salt.

CONTRIBUTION FROM
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The Reaction between Selenium Tetrachloride and Copper.—The reactions between the chlorides of selenium and copper are comparatively much simpler than those between the oxychloride and the same metal.[1] We have determined the course of the reactions both with the monochloride and with the tetrachloride, by analysis. Our results with the former compound agree with those obtained about the same time by Lenher and Kao.[2] On account of qualitative observations we consider that the reaction probably proceeds according to Equations 3 and 4 below.

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[1] Howe and Haynes, THIS JOURNAL, **47**, 2920 (1925).

[2] Briggs, *J. Chem. Soc.*, **127**, 1042 (1925).

[1] Ray, THIS JOURNAL, **45**, 2090 (1923).

[2] Lenher and Kao, *ibid.*, **48**, 1550 (1926).

Selenium tetrachloride, made in the usual manner from selenium kindly supplied by the Baltimore Copper Company, was transferred to a bulb at the bottom of a glass tube. This was then bent at an obtuse angle, a weighed roll of freshly reduced copper gauze was introduced, the whole was evacuated through a tube containing phosphorus pentoxide and sealed to the pump. It was then heated for some hours at 105°. The selenium tetrachloride disappeared, and was replaced by drops of a brown liquid (the dichloride, Se_2Cl_2); finally these also were absorbed. The copper gauze was ground in a mortar, and the unchanged copper was picked out. Samples of the total product, and of the soluble and insoluble parts of this, were analyzed separately, and the combined copper, selenium and chlorine were compared with the weight of the selenium tetrachloride taken. All checks, for which analytical data are supplied in our complete paper, agree satisfactorily with the equation,

$$SeCl_4 + 4\ Cu = Cu_2Se + 2\ CuCl_2 \qquad (1)$$

Summary.—By combining the qualitative with the quantitative results, we conclude that the reactions proceed in the following stages,

$$2\ SeCl_4 + 3\ Cu = 3\ CuCl_2 + Se_2Cl_2 \qquad (2)$$

$$Se_2Cl_2 + 5\ Cu = 2\ Cu_2Se + CuCl_2 \qquad (3)$$

and with an excess of the chlorides thus

$$2\ Cu_2Se + 4\ Se_2Cl_2 = 4\ CuCl_2 + 10\ Se \qquad (4)$$

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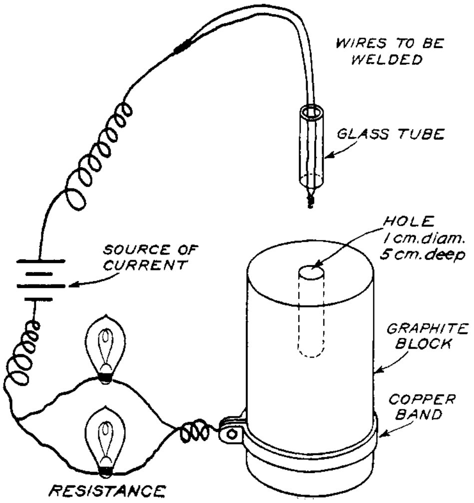
A Device for Arc-Welding Easily Oxidizable Wires.—I have found the following device very serviceable in welding thermocouples. A hole 1 cm. in diameter and 5 cm. deep is bored in a graphite block. The block forms one terminal and the wires to be welded the other terminal. A drop of "oil-dag," or of common lubricating oil, is dropped into the hole, and the wires are placed in the hole to make a contact with the oil. The wires are then quickly pulled out a very little and the resulting arc, in a reducing atmosphere, gives a very good weld.



A glass tube, open at both ends, may be slipped over the