ditions, in that the reduction of the perchromic acid to a chromic salt is so rapid that one often fails altogether to get the blue color of the perchromic acid. It does not seem to be well known that if the hydrogen peroxide is *first* added and thoroughly mixed with the neutral or alkaline chromate solution (made alkaline, if necessary, by the addition of caustic soda or potash but not ammonium hydroxide) and the solution *then* acidified with some dilute acid (preferably dilute sulphuric or nitric but not hydrochloric acid) that the method practically never fails to give a good blue color even when *no* ether is used. In fact, the ether is entirely unnecessary except for traces of chromium. W. J. KARSLAKE.

UNIVERSITY OF IOWA. IOWA CITY, IOWA.

Effect of Water on the Freezing Point of Molten $CaCl_2.6H_2O$.—Mr. G. Cock[1] has recently called attention to an error in the calculation of the molecular weight of water in molten $CaCl_2.6H_2O$ by the Richards method as given on page 1172 of Morgan and Benson's paper, "Molten Hydrated Salts as Solvents for the Freezing Point Method,"[2] which raises the apparently normal value to that same, abnormal, one derived from the Beckmann method. How this error arose it is impossible now to say, but apparently these results were the only ones that were not checked several times after the original calculation.

The peculiarity of the results as originally given by Morgan and Benson was that while the Beckmann method gave an abnormal molecular weight for added water, the Richards method gave nearly a normal one. Although at the time, little attention was paid to this, the behavior of water being discussed in only a few lines, and not included in the summary of results, it was intended to make it the subject of a later investigation. Such an investigation, of course, would have brought to light the error which Mr. Cock has discovered, but a press of other work has up to the present time prevented even the beginning of it.

By thermodynamical reasoning[3] it can be proven that the addition of either water or anhydrous calcium chloride to molten $CaCl_2.6H_2O$ *must* produce an abnormally small depression of the freezing point of that solvent, and consequently will lead to an abnormally large molecular weight of the added substance. Hence, now that attention has been called to this error, it is evident that both the Beckmann and Richards methods lead to the same conclusion as that obtained by the theoretical consideration of the subject.

[1] *Z. anorg. Chem.*, 60, 191–2 (1908).

[2] THIS JOURNAL, 29, 1168–75 (1907).

[3] van't Hoff, "Lectures on Theoretical and Physical Chemistry," English translation, Vol. 1, p. 72 (1898); and also Lewis, *Proc. Am. Acad. of Arts and Sciences*, **43**, 287 (1907).

Mr. Cock is in error, consequently, when he assumes the abnormal behavior of water to be due to the fact that the solution is too concentrated with respect to water, as he will see by reference to either of the above mentioned works. J. LIVINGSTON R. MORGAN.

COLUMBIA UNIVERSITY, December 14, 1908.

REVIEW.

REVIEW OF INORGANIC CHEMISTRY, 1908.

JAS. LEWIS HOWE.

Received December 21, 1908.

In his inaugural address as rector of the Technical High School at Graz, Emich[1] discussed the present tendencies of pure chemistry. While it is not impossible that were the views of Wald and Ostwald to be followed out to their logical conclusions, we might gain as clear a conception of matter as is given us by the atomic theory, as far as regards economy of thought, the atomic theory cannot be equaled, nor is any reform of view demanded from the standpoint of either chemist or physicist. Among problems immediately before us are the connection between chemical structure and crystalline form, and between chemical structure and color. These problems are particularly important in organic chemistry. The development of physical chemistry enables us to forecast, to a considerable degree, the phenomena which are taking place in gases and solutions. In such predictions, valence, of such dominating importance in organic chemistry, has its value only in connection with Faraday's law. Werner's conceptions utilize both view-points. Since the radium emanation possesses the character of the inactive gases, further developments along this line are to be looked for, and the speculations of Mendeléeff regarding the nature of ether are unnecessary. Since these transformations of the elements are unaffected by the temperature, they stand in sharp contrast to chemical changes. Both electric and radioactive investigations point to the complex nature of the atom, so that we may consider ordinary chemistry as the chemistry of the molecule, while radioactive chemistry is that of the atom. Since the free existence of atoms of negative electricity is known, while free positive electrons have not been isolated, we may conclude, according to Ramsay[2], that positive electricity is merely the absence of negative electricity. Compounds between the negative electron and material atoms, *i. e.*, ions, exist not only in the gaseous condition and in solution but also in solid form, as is rendered probable from the many analogies between solid and dissolved salts. It is probable, for example, that the metal sodium is really a compound of some, now unknown, electron-free substance and the electron. So Thomson has shown that zinc loses its electrons more readily than platinum. Fluorescence and tautomerism in organic compounds are probably due to the oscillation of the electrons, the vibration showing itself, at least, in ultraviolet rays.

The experiments of Ramsay, a year ago, which seemed to indicate a

---

[1] *Oester. Chem.-Ztg.* [2], 11, 105.

[2] *Ibid.*, p. 111.