

It is noticeable that Prof. Thomsen's density of hydrogen is higher than that of Prof. Morley, while his ratio for the atomic weights is lower. This seems to indicate that the hydrogen obtained by Prof. Thomsen was contaminated with a trifling amount of some impurity. From the experiments of Prof. Morley it seems probable that hydrogen evolved by the solution of aluminium in potassium hydroxide containing a small amount of the carbonate would contain carbon. As no account is given in the paper of any attempt to exclude the presence of potassium carbonate, or if any experiments to prove the absence of compounds of carbon or of other impurities in the hydrogen used, it is, at least, possible that the difference in the results of the two workers is due to this cause.

To one familiar with the character of such work it is rather a matter of surprise that the difference is not greater.

W. A. NOYES.

A Dictionary of Chemical Solubilities, Inorganic.

By ARTHUR MESSINGER COMEY, PH. D.
8mo. Pp. 515. London and New York,
Macmillan & Co., 1896.

The attempt is made in this book to give reliable data concerning the solubility of all inorganic substances that had been analyzed before March, 1894.

"The solubility of the substance in water is first given, the data being arranged chronologically in the longer articles. Then follow the specific gravities of the aqueous solutions, and also any data obtainable regarding their boiling points; other physical data concerning solutions are not included. Following this is the solubility of the substance in other solvents—first, the inorganic acids; then alkali and salt solutions, and finally organic substances."

The theories of solution are not discussed, the term 'soluble' being used to indicate that "a solution of some sort has been formed."

The plan of the book is admirable and, so far as our examination has extended, there are no serious omissions. The arrangement of the compounds and the nomenclature adopted are satisfactory and, probably, as good as any that could be employed.

A synchronistic table of periodicals is added

in an appendix as well as some formulas and tables for the conversion of various hydrometer scales into specific gravity.

The work is a worthy successor to the earlier volume of Prof. Storer, and the author deserves the thanks of his colleagues for the time and labor he has put upon it.

L. B. HALL.

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On the Specific Gravities of Mixtures of Normal Liquids: By C. E. LINEBARGER. The methods used to determine the molecular masses of liquids, which consist either in converting the liquid into the state of vapor and determining its specific gravity in this condition, or in determining the change in freezing- or boiling-point of a solvent upon the addition of the liquid, do not throw much light on the molecular complexity of the substance in the liquid state. From work in other lines it is probable that in some cases the molecular aggregate is the same in the liquid as in the gaseous condition; but in other cases the complexity increases as the substance passes from the gaseous to the liquid condition. The present paper is a study of the changes in specific gravity which take place when liquids which suffer no change in passage from one state of aggregation to another are mixed. In cases where association or dissociation takes place the number of factors which enter into play is so great that no general conclusions can be drawn. In the determinations pycnometers of a special form were used, and in most cases great precautions were taken to secure pure substances. If two liquids of different chemical composition are mixed, the volume of the resulting liquid will not be equal to the sum of the volumes before they were mixed, but will be greater or less. This is explained by the fact that dilution diminishes the molecular attraction and the internal pressure. The number of molecules in the unit of surface decreases and the volume increases. In this paper the observed and calculated results for a large number of mixtures are given; but the data at command at present is not sufficient to enable one to draw any general conclusions.

Dianthranol—A Dyhydroxyl Derivative of Dianthracene: By W. R. ORNDORFF and C. L. BLISS. When anthranol in benzene solution is exposed to the sunlight crystals, having the same percentage composition as the anthranol, but differing in other ways, separate out. The substance can also be obtained by boiling the anthranol for a long time in xylene, and by shaking a solution of anthranol in caustic potash, in contact with the air. The determinations of the molecular weight show that it has twice that of anthranol. A crystallographic study of the crystals shows also that this substance is different from anthranol. Some derivatives were also made and studied. The formation of a diacetyl derivative shows the presence of two hydroxyl groups, and the authors consider that it is made up of two molecules of anthranol, in which the two hydroxyl groups are intact. They think that the union takes place by the breaking of the para bond between the two γ -carbon atoms and the joining of the groups.

Bromine Derivatives of Metaphenylene Diamine: By C. LONG JACKSON and S. CALVERT. In the course of an investigation of the behavior of tribromdinitrobenzol, the authors tried the action of tin and hydrochloric acid in hopes of either replacing some or all of the bromine. The number of cases on record, in which the bromine has been replaced by hydrogen when treated with this reducing agent, is small. As the result of work contemporary with this, Schlieper concludes that the bromine which stands in the ortho position to two negative groups is replaced in this manner; but the authors of this paper find this not to be strictly true, for they succeeded in replacing all three bromine atoms in tribromdinitrobenzol, a result not in accord with the above mentioned theory. They conclude that the ortho position, while not absolutely necessary, is yet very favorable for the replacement. The cause of the easy replacement is probably due to the fact that there are other radicals attached to the benzene ring, but their nature does not affect the result. They made several bromine derivations of phenylene diamine and also salts of these products.

On the Halogen Derivatives of the Sulphonamides: By J. H. KASTLE, B. C. KEISER and E. BRAD-

LEY. The authors find that chlorine and bromine derivatives of the sulphonamides can be prepared; but up to the present they have not been able to obtain similar ones containing iodine. These substances are somewhat similar to the acid chlorides and are also unstable, exploding when heated rapidly. Their composition can be explained in two ways, as they can be regarded either as addition—or substitution—products of the sulphonamides. The authors consider the evidence to be in favor of the latter, for not only do they show an analogy to nitrogen trichloride in their instability, but they are good oxidizing agents and are easily decomposed by acids. The easy evolution of chlorine is explained more readily by the substitution theory. If it is an addition product we should expect the chlorine to come off in combination with hydrogen, which it does not do. Just as nitrogen trichloride reacts with hydrochloric acid to form ammonium chloride and chlorine, so these products react to form the amide and the halogen.

The Reduction of Copper Sulphide: By DELIA STICKNEY. The author finds that copper sulphide can be readily reduced by allowing it to come in contact with the Bunsen flame. If the substance is heated in a crucible the reduction is always incomplete. The addition of some sulphur to cupric and cuprous oxides facilitates the reduction to metallic copper.

This number contains a review of the work done in the field of carbohydrates during the last year, and a physical-chemical study of the Gas Battery.

Brief reviews of the following books are also given in this number of the *Journal*. *Elektro Metallurgie*, Dr. W. Borschers; *Lehrbuch der Elektrochemie*, Dr. M. Le Blanc; *Laboratory Experiments in General Chemistry*, Chas. R. Sanger; *A Short Course of Experiments in General Chemistry with Notes on Qualitative Analysis*, Chas. R. Sanger; *The Scientific Foundations of Analytical Chemistry, treated in an Elementary Manner*, W. Ostwald; *A textbook of Gas Manufacture for Students*, J. Hornby; *The Elements of Chemistry*, P. C. Freer; *Repertoire des Réactifs Spéciaux, Généralement Désignés sous leurs Noms d'Anteurs*, Jean et Mercier. J. ELLIOTT GILPIN.