

Mineralogical Chemistry.

The Rôle of Inorganic Agencies in the Deposition of Calcium Carbonate. JOHN JOHNSTON and E. D. WILLIAMSON (*J. Geology*, 1916, **24**, 729—750).—The authors discuss the effects producible by variation of certain factors which affect directly the solubility of calcium carbonate, and thus induce its precipitation from aqueous solution. The factors concerned are the partial pressure of the carbon dioxide in the atmosphere, the temperature, and the concentration of the solution in respect of calcium. At a given temperature, the equilibrium between calcite and its saturated solutions is determined by the coefficient of solubility of carbon dioxide, the ionic solubility product, $[Ca^{++}][CO_3^{--}]$, the ionisation-coefficients of carbonic acid, and the coefficient of hydrolysis of calcium carbonate. The free and the total carbonic acid, that is to say, $[H_2CO_3] + [CO_3^{--}] + [HCO_3^-]$, determine the degree of alkalinity or acidity of the solution as measured by $[OH^-]$, and no change can be made in any one of these quantities without affecting each of the others. At 16° , the solubility of calcite increases from 44 to 75 parts per million, when the partial pressure of the carbon dioxide increases from 0.0001 to 0.0005. Under atmospheric conditions for which the mean value of the partial pressure may be taken as 0.00032, the

solubility decreases from 81 parts per million at 0° to 52 parts at 30°. A change in the partial pressure from 0·00032 to 0·00030, or an increase of temperature of 2°, would result ultimately in the precipitation of about 2 grams of calcite from every cubic metre of a solution saturated with it.

Comparison of the calculated solubilities with the available analytical data indicates that the warmer surface layers of the sea are substantially saturated with respect to calcite, and precipitation is consequently to be anticipated if there is a reduction in the partial pressure of the atmospheric carbon dioxide or a rise in temperature of the surface layers in question.

In regard to biological processes which result in the deposition of calcite, it is pointed out that the above-mentioned inorganic factors must be taken into account, no matter what may be the agency which is supposed to be directly responsible for the deposition. There are grounds for believing that calcareous organisms are more abundant the more nearly saturated the water is in respect of calcium carbonate, and it is suggested that the decreasing abundance of calcareous organisms toward the polar regions is a question, not only of the decrease of general vitality but also of the decreasing capacity of the organism to secrete calcium carbonate from colder sea-water in which the degree of unsaturation is greater than for the same water at a higher temperature.

Although arragonite is occasionally formed in nature, it is considered that pure arragonite cannot persist in contact with sea-water for any length of time. If, however, the arragonite takes up other substances in the form of a solid solution, and its solubility is thereby reduced below that of calcite, it is possible that such impure arragonite may be stable in contact with sea-water.

It is considered that the accurate determination of temperature, salinity, and free and combined carbonic acid in sea-water in a systematic way would have an important bearing on many outstanding biological and geological problems.

H. M. D.

Posthumous Stratifications in "Principal" Anhydrite.

M. RÓZSA (*Zeitsch. anorg. Chem.*, 1916, **98**, 327—332).—The "principal" anhydrite is the more recent anhydrite of the potash deposits. At Stassfurt this deposit is as much as 80 metres thick. It frequently contains posthumous lenticular and vein-like layers of other salts, analyses of which are given. The changes are partly due to the injection of plastic masses of salts under pressure and partly to chemical transformations.

C. H. D.

Presence of Nickel and Cobalt in Chromites.

S. PIÑA DE RUBIES (*Anal. Fis. Quím.*, 1917, **15**, 61—65).—An account of spectroscopic analyses of samples of chromite, some of which contained cobalt and nickel.

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