

Any rise in the cysteine content of set fibres would not, therefore, be detected in the hydrolysate if set is due mainly to the formation of sulphenamide cross-linkages.

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A Method for Overcoming 'Unsoundness' in Magnesian Limes

BUILDING failures arising from the use of limes with a high content of magnesia have frequently been observed. These failures—such as spalling and blistering of plaster coats, disintegration of mortar joints and expansion of brickwork—are, according to Wells and others^{1,2}, caused by the slow hydration of the magnesia in these 'unsound' limes, and may extend over periods up to several years. Complete hydration of these limes can be obtained by treatment with high-pressure steam; this treatment, however, which is extensively used by American lime manufacturers, is expensive both in equipment and operation, and a simpler one is desirable. Experimental work in this Division has been based on the principle underlying Sorel cement manufacture, in which inert basic salts of magnesia such as magnesium oxychloride or magnesium oxysulphate are formed by the reaction between magnesium oxide and magnesium chloride or magnesium sulphate.

For the initial stages of the work in the laboratory, artificial mixtures of calcium oxide and magnesium oxide, prepared from the precipitated carbonates in proportions found in natural limestones, were used. The salts calcium chloride, magnesium chloride, magnesium sulphate and ammonium chloride were added to the samples, either in the hydrating water or after the hydration of the lime to powder or putty. In all instances the unsoundness as determined by a modified Le Chatelier autoclave expansion test (National Building Studies Special Report No. 3, 1948) was so reduced by calcium chloride, magnesium chloride and ammonium chloride that the material could be classed as sound. Magnesium sulphate was found to be much less effective than the other salts. The best results were obtained with calcium chloride added to the mixing water after hydration.

The salt treatment, when repeated with dolomite and magnesian limes made from natural materials, produced a similar decrease in expansion. On a pilot-plant scale the treatment proved equally satisfactory.

The effect of the salts on the general properties of mortars and plasters made from treated material has been investigated. The consistency, bulk density, workability and hygroscopicity were found to be

practically unchanged, and the amount of water-soluble salts was well within the permissible limits. Plaster panels applied to a wall in the ordinary way are at present under observation.

The theoretical background of the reactions taking place in the process is being studied.

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Salting-out Chromatography of Amino-acids and Peptides in Filter Paper and other Media

EARLIER investigations in this Institute¹ have shown that substances like dyestuffs and some proteins show a very marked increase of adsorption on to filter paper and other adsorbents in presence of salts in large concentrations. The adsorption may thus be increased from practically zero (in pure water) to considerable amounts, and the phenomenon may be utilized for chromatographic separations, using salt solutions of lower concentrations or even water for the elution. Similarly, Holman and Hagdahl² found that the adsorption of fatty acids on to carbon from solutions in ethanol was very markedly increased if the solubility was reduced by adding water to the solution.

In general, it is to be expected that the adsorption will increase as the solubility is reduced by changes in the medium which do not appreciably affect the adsorbing surface³. Recently, we have found that amino-acids and peptides show the same phenomenon both on charcoal and filter paper, and it is possible to obtain very satisfactory paper chromatograms based upon the salting-out principle by using, for example, strong phosphate buffer solutions as a medium. Figs. 1 and 2 show some paper chromatograms obtained in this way. (In absence of salts the adsorption is very small.) It is interesting to note that the order of the R_F values is to a certain extent reversed as compared with ordinary partition chromatography in butanol-water systems.

There seems to be a tendency for the salt to collect at the solvent front in the paper even if evaporation is prevented, and therefore the best results are obtained if the original spots are applied at a considerable distance behind the front. This enrichment of salts towards the advancing front points to a negative adsorption of the salts, that is, the water is more strongly bound by the cellulose than are the salts. This provides the necessary conditions for a salting-out effect, which may, of course, also be regarded as a kind of partition between a salt-rich and a salt-poor medium. There may also be some relations between this phenomenon and those described by Herbert and Pinsent⁴ and Martin and Porter⁵, where a second phase is created in ethanol-water or 'Cellosolve'-water systems by salting out, by which suitable conditions for chromatography of some proteins have been realized. The analogy to the effects of high salt concentrations in counter-current extraction according to Craig should also be noted⁶.