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PUBLIC HEALTH REPORTS

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U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
ARTHUR S. FLEMMING, *Secretary*

PUBLIC HEALTH SERVICE
LEROY E. BURNEY, *Surgeon General*

ECHOES from Public Health Reports

An Experimental Study of the Relation of Hydrogen Ion Concentrations to the Formation of Floc in Alum Solutions.

By Emery J. Theriault, Assistant Chemist, and W. Mansfield Clark, Chief of Division of Chemistry, Hygienic Laboratory, United States Public Health Service.

In approaching a scientific analysis of the art of water clarification it seems to us essential to distinguish the several aspects of the subject. These are so integrated in actual plant operation that it is difficult to perceive the true importance of each of the several factors which have to be mastered by the operator under every exigency. The isolation of phenomena, and their exact quantitative evaluation, will alone permit a true appraisal of any factor in relation to the process as a whole.

We have limited our attention to certain laboratory experiments which clarify one distinct aspect of the alum process. Our data doubtless lack the scope desirable for general practical application, but they indicate that, unless factors still to be investigated have an unexpected influence, maximum precipitation of added aluminium will occur within definite and narrow limits of hydrogen ion concentration.

It is well recognized that a precipitate is not formed from alum when the final solution is either too "acid" or too "alkaline." Hitherto the essential degree of "acidity" or "alkalinity" has been sought in the *quantity* of acid or alkali determined by one or another analytical method. More recently there has been a growing appreciation of the fact that the waterworks operator is dealing with reversible reactions, that his task is to control equilibria, and that all too [illegible] methods of the analyst, devised originall[illegible] ses, upset an established equilibrium to yi[illegible] ious value to the case at hand.

[illegible] little need to review here the rel[illegible]

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Emery J. Theriault collaborated with W. Mansfield Clark in showing the relation of hydrogen ion concentrations to the formation of floc in alum solutions, a basic contribution to further studies.