

hope of getting an ammon. So our plan was to go to Kaiser next day if fuel was available there.

The people of Chumatang were not so pleasant as other Ladakhis. The servants had difficulty in getting milk, and when dishes were given for milk to be brought in, they were not returned. Probably the head man of the village was rather a rogue, as this was anything but characteristic of the country people.

Chumatang has a delightful situation, the valley is broader there, and although I can remember only one stunted tree in the middle of the village, the edges of the fields were green, and the whole place had a tidy, well-kept appearance.

(To be continued.)

Current Literature.

STREETER, H. W. **Experimental Studies of Water Purification. VI. General Summary and Conclusions.** *Pub. Health Rep. Wash.*, 1933, v. 48, 377-400, 10 figs. [Refs. in footnotes.]

Some of the previous reports for the experimental station at Cincinnati have been summarized [this *Bulletin*, 1927, ii, 637; 1928, iii, 275; 1931, vi, 73]. The present report deals only with some of the more important results. Comparisons were made of the efficiency of purification by the method of coagulation-sedimentation followed by filtration and post-chlorination when applied to three different raw waters. Although the ultimate results were approximately equal, the relative efficiency of the different stages was markedly different. It is possible that this divergence is in part due to differences in pH of the raw water as the bacterial efficiency of coagulation-sedimentation is sharply diminished at pH values exceeding 7.0 or thereabouts; the water which was least purified at this stage had a pH of 7.8 to 8.2. The general results appear to justify the current tendency in rapid sand filtration plants to depend largely on chlorination for bacterial removal and assign to the preliminary sedimentation and filtration processes merely the function of clarification.

Experiments on variations in the conditions of coagulation with aluminium sulphate led to the following conclusions: (1) the efficiency is diminished with pH values exceeding 7.0 and improved with values approaching 5.5; (2) the efficiency depends on the amount of coagulant added and the total period of sedimentation. There appears to be no difference between double-stage and single-stage coagulation provided the total amounts of coagulant and the period of sedimentation are the same in both cases.

Studies on the excess-lime process indicate that viewed apart from its function in water softening, the treatment has not the same advantages as pre-chlorination in reducing bacterial numbers. A well-marked bacterial

reduction in lime-treated waters occurs only when the residual pH approaches or exceeds 10.0. The relationship between raw and purified waters in respect of concurrent variations in their bacterial quality appear to be governed by a fundamental law. The restrictions imposed by such a law on the efficiency of bacterial removal are such as to limit the average quality of effluent obtainable by a particular combination of treatment from a raw water of a given average degree of pollution.

The effect of storage, a treatment which has not been greatly used in America hitherto, was also studied and it is likely that both natural and artificial storage will assume a rôle of increasing importance in the development of water purification systems in the States.

M. E. DELAFIELD.

Reprinted from "Bulletin of Hygiene," Vol. 8, No. 8.

ALI, M. "Verdunisation," the Bunau-Varilla Process for Chlorination of Water, Description and Testing. *Tech. Gemeindebl.* 1932, v. 35, 269. [Summary taken from *Dept. Scient. & Indust. Res. Water Pollution Research. Summary of Current Literature.* 1933, v. 6, 150.]

The author gives an historical account of the discovery, nature and application of the process of Verdunisation and discusses the theory of the bactericidal action of rays liberated by the attack of hypochlorite on organic matter and the nature of the evidence in favour of the process. In published results of experiments the chlorine demand of the water used has not been given, parallel experiments without shaking have either not been carried out or have been made by adding the chlorine to still water so that there is not complete contact between chlorine and water, and Vincent's colorimetric method, which loses its sensitivity with damaged *B. coli*, has been used. The author then describes parallel experiments made with water chlorinated with about 0.1 mg. per litre and vigorously shaken, water chlorinated and shaken only sufficiently to ensure thorough mixing, and unchlorinated water. The chlorine demand was determined before and after chlorination and was found to decrease considerably. The results showed that it was not always possible to disinfect clear water, regardless of its chlorine demand, with 0.1 mg. per litre of chlorine. Vigorous agitation was found to have no effect on the bactericidal action of chlorine. The only advantage of vigorous agitation appears therefore to be that of rapid mixing.

Reprinted from "Bulletin of Hygiene," Vol. 8, No. 8.

GOUDEY, R. F. Recent Trends in the Field of Sewage Sludge Digestion. *Munic. San.* 1932, v. 3, 289. [Summary taken from *Dept. Scient. and Indust. Res. Water Pollution Research. Summary of Current Literature.* 1933, v. 6, 168.]

Abstract of a paper presented to the California Sewage Works, Assoc., May, 1932. Research has shown that to procure a digested sludge with a

lower water content and better dewatering properties attention must be paid to enzymes, catalysts, and filamentous bacteria. Digestion at pH 5.5 in the presence of iron and lipase, followed by second stage digestion at pH 7.5 in the presence of diastase, with use of lime for conditioning, will break down amino acids, give a sludge of low water content which is rapidly dewatered, and increase gas production. The agencies which cause and control bulking in activated sludge also affect bulking in fresh and digested sludges. Foaming in Imhoff tanks is comparable with bulking in activated sludge. Reduction of alkalinity in sewage during treatment has been found to be almost equal to the increase of alkalinity in digested sludge *plus* the equivalent represented by the carbon content of the gas, suggesting a distinction between the inorganic alkalinity of the sewage and what may be termed organic alkalinity subject to change by bacterial action. Sludge from thermophilic digestion is difficult to dewater, odorous, and apt to breed flies on drying beds. Return of overflow liquor from digestion tanks to the raw sewage adds to the oxygen demand and suspended solids content and introduces products of decomposition. The problem has been solved by drawing off digested sludge simultaneously with the introduction of fresh sludge; the water content of the digested sludge is thus increased about two per cent, but a conditioned sludge can be thickened, giving a clear water whose disposal offers no difficulty. (*Sewage Works J.* 1932, v. 4, 609).

Reprinted from "Bulletin of Hygiene," Vol. 8, No. 8.

Reviews.

ANNUAL REPORT OF THE SURGEON-GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES FOR THE FISCAL YEAR 1932. Washington: Government Printing Office. Price \$1.00 (cloth).

This is the sixty-first annual report which has been issued during the 134 years existence of the Public Health Service of the United States, and it covers the work of the Service for the year ending June 30, 1932, with health figures for the year 1931. Surgeon-General H. S. Cumming in submitting the report to the Secretary of the Treasury gives a brief summary of health conditions during the year, and of various activities of the Public Health Service. He states that the increasing use of international aerial transport makes it of special importance that current information relating to the prevalence of disease in foreign countries be available. Those who study the monthly *Bulletin* of the Public Health Service realize how minutely epidemiological records from all parts of the globe are summarized and widely distributed.

The Public Health Service can again be congratulated on the fact that no case of quarantinable disease gained admission to the United States.