typhoid fever. The treatment was begun in April, 1912. Data are available only for the period from 1911 to the present time. In 1911 there were fourteen deaths from typhoid fever, and in 1912 there were twenty. The next year there were only two deaths, then for two years there were no deaths, and then three and six respectively for the two following years. In other words, for the entire period of five years since water disinfection was begun, there have been only eleven deaths from typhoid fever. The water supply at Waukegan should be filtered, because it usually carries considerable organic matter and turbidity. In this city the disinfection process has had exceptionally careful and conscientious supervision.

The Milwaukee curve shows an appreciable reduction in the typhoid rate after chlorination was practiced regularly. Hypochlorite was used June 21st to December 12th, 1910, not at all during 1911, February 2nd to March 18th, 1912, and then continuously after April 12th, 1912, until May, 1915, when liquid chlorine was substituted for hypochlorite and has been used continuously since that time. The average for the five-year period while disinfection was not in use (1906, 1907, 1908, 1909 and 1911) was 21.8. For the period 1913-1917, inclusive, the rate dropped to an average of 8.9, or a reduction of 59%.

Statistics Prove Chlorine's Efficiency

The water supply of Omaha is obtained from the Missouri River, which name is almost synonymous with "mud," and is coagulated and settled in large basins. In 1910 hypochlorite treatment was installed. For the period 1906-1909, inclusive, the typhoid fever rate was 99 per 100,000. For the period 1911-1917, inclusive, the rate was 25.4, a reduction of 74.3%, which is truly a remarkable accomplishment. The change to liquid chlorine was made in 1915. The death rate has steadily and consistently dropped since 1910, and for both 1916 and 1917 was below 5 per 100,000.

There is no doubt but that the use of liquid chlorine will continue to grow. The only danger is from over zealous sanitarians recommending its application in cases where it is not called for or in cases where it should be used in conjunction with some other process. As with all purifying agents, it has its limitations. Within its sphere of usage, it has demonstrated its reliability and simplicity, and its efficiency is proven by the above-mentioned typhoid fever statistics.

CANADIAN RAILWAYS AND CANALS

According to the annual report of the Department of Railways and Canals for the year ended March 31st, 1917, the total expenditure of the Dominion government for railways and canals was $48,226,082.40, of which just about $6,000,000 was for canals. The revenue for the year was $24,001,181.75, only about $500,000 of which came from canals. The total expenditure on railways and canals and revenue from them, up to March 31st, 1917, is as follows:—

Expenditure on railways	$734,998,814.43
Expenditure on canals	164,140,734.44
Expenditure common to both	1,457,384.31
Revenue from railways	248,395,298.47
Revenue from canals	16,665,271.32

The railway expenditure for the year ended March 31st, 1917, included $14,737,326.70 charged to capital account. This consisted of expenditure on the Quebec bridge, the Intercolonial Railway, the National Transcontinental, the Prince Edward Island Railway, the Hudson's Bay Railway, and other items. The expenditure on the Intercolonial on revenue account was over $15,000,000, on the Prince Edward Island over $800,000 and on the National Transcontinental almost $8,000,000.

EFFECT OF WATER IN CONCRETE

DOES the strength of concrete for given materials, made up and tested in a similar manner, depend upon nothing except the relation between the amounts of water and cement in the mix? Duff A. Abrams, professor in charge of the structural materials laboratory of the Lewis Institute, Chicago, claims that it does, so long as a plastic mix is secured. In an article written for "Engineering News-Record," of New York City, Prof. Abrams indicates that the aggregate plays no part in the strength of the concrete except insofar as its properties affect the quantity of water required. Commenting upon Prof. Abrams' article, the "Engineering News-Record" says editorially:—

"Entirely Without Precedent," Says Editor

"The article by Prof. Abrams on the basic principle of concrete mixes is noteworthy for the consistency of its data and the simplicity of its indications. The studies which have been carried out in the structural materials laboratory of Lewis Institute are entirely without precedent, bringing out clearly the fact that former studies of this kind have failed to reveal the elemental principles of concrete proportioning. Past failures can be traced to the circumstance that but little systematic effort was made to analyze the factors which affect the strength and other properties of this material. . . . These investigations also lead to many important conclusions regarding the testing of cement. For instance, it is Professor Abrams' belief that the whole scheme of cement testing should be radically modified. The data in the article suggest that if strength tests of cement were made on neat specimens of such a consistency that the water content were the same as that used in ordinary concrete mixes, a strength would be obtained which would be an exact indication of the strength of the concrete itself—clearly intimating that the testing of cement in connection with sand or aggregates tends only to complicate the problem while not serving any useful purpose. This supposition has been remarkably borne out in the experiments which are being carried on. Professor Abrams has found that neat cement mixed with about twice the amount of water indicated by the test for normal consistency exhibits, in compression, about the same strength as is shown by a 1:2:4 concrete specimen in which the relative quantity of water is about the same. Since purely physical facts are found inevitably by systematic study, it is unfortunate that there are not a greater number of laboratories devoting their attention to the many problems, so far indeterminate, with which the engineer has to deal. The example of the Portland Cement Association in bearing so great a part of the cost of Professor Abrams' work is one that should be followed more frequently."

The article to which the above-quoted editorial refers, is reprinted here in full on account of the apparently revolutionary results obtained:—

Water is Essential Element of Mix

Concrete, it is commonly stated, is composed of a mixture of cement, sand and pebbles or crushed stone. This conception of concrete overlooks one essential element of the mixture—water. An exact statement of the ingredients of concrete would be: Cement, aggregate and water. The last-named material has not yet received proper consideration in tests of concrete or in specifications for concrete work.

Early users of concrete centered their entire attention on the quality of the cement, and practically disregarded