handicap. There is, of course, no alternative but to go on and build the ships, and, if necessary, write off the excess cost. Canada will need the ships. It needs a steel plate industry. It needs a ship-construction industry. The excess cost is as nothing compared with the waste of our railway era.

Germany built up a merchant marine of 5,000,000 tons by an elaborate system of subsidies and bounties. That merchant marine served Germany's trade interests so efficiently that the money devoted to subsidies was returned to the nation many times over. The experience of Canada is likely to be the same. Even if some of the fourteen shipyards now building steel vessels die off when the government contracts are finished, the remaining ones will have been so strengthened as to be able to compete on a fairly good basis for outside business. But it is probable that the expansion of Canadian business and traffic after the war will give them plenty of Canadian orders.

WATER TOWERS AND STANDPIPES*

FOR the most satisfactory and economical operation of any waterworks plant, an elevated reservoir is a necessity. It gives a reserve supply for fire protection, a high and uniform pressure on the mains and a minimum cost of pumping. If a natural elevation is available, a flat-bottom standpipe of large diameter and small height placed directly on the foundations is the most economical structure. When no elevation is available within a reasonable distance, a steel tower and tank is the proper substitute. In deciding whether a water-tower or standpipe should be used, account should be taken of the advantage of central location as well as the cost of laying additional pipe to reach the desired location.

While a standpipe is well adapted to meet certain conditions, one of small diameter and large height is never satisfactory. The first metal structures built for the storage of water were standpipes only a few feet in diameter and of sufficient height to give, when filled, the pressure required. Such a design is uneconomical, as the amount of serviceable water stored in such a tank is only a small portion of the total capacity. The water below an elevation of eighty feet is of little value for fire protection, and serves only to support the water above that point. Several times more water can be stored at an effective height for the same cost by a water-tower than by a standpipe. The tall cylinder of small diameter also has the great disadvantage of extreme variation in pressure between the time when it is full and empty. The water-tower and standpipe are not rivals, but each has its own distinct field of usefulness.

A tank should be of sufficient capacity to store the water used during the hours when the pumps are shut down and also leave at all times sufficient water in the tank to supply one or more fire streams for a reasonable period of time. Fifty gallons per inhabitant, with a liberal allowance for an increase of population, should be the minimum capacity provided, and no tank for municipal service should hold less than 30,000 gallons.

The height to the bottom of the tank should be at least eighty feet above the ground level at all points where the fire protection is needed. It is, however, often possible to locate the tank on a natural elevation so that the water-tower itself will not need to be eighty feet high.

*Abstracted from an article in April issue of "The Water Tower," house organ of the Chicago Bridge & Iron Co.

LETTER TO THE EDITOR

Gas From Waste Wood

Sir,—Replying to your letter of April 18th, the process of gas making from wood which we have been working upon here, has for its purpose the utilization of waste wood rather than the use of cord wood, making the charcoal residues of questionable value, since they are too fine for any of the ordinary uses of charcoal if the waste used is hogged wood. It is therefore difficult to make a comparison of costs by this process with the analysis of Riche costs given by Mr. Bacque in his recent article in your paper.

As a general proposition we have been able to get eight cubic feet of 480 B.t.u. gas from a pound of moderately resinous wood such as Douglas fir, this material being weighed with about 15% moisture. From this you can make your own estimate of the cost of 1,000 feet of gas of this quality, so far as costs of material alone are concerned, with any priced wood that you may assume. The comparison with the Riche costs will be unfavorable unless something can be secured as a credit by the sale of charcoal.

Mr. Bacque figures that with wood at $4.00 a ton, the net cost of materials would be 12.77 cents. If this same wood were to be made into 480 B.t.u. gas by our process, the cost, with no credit for charcoal, would be 25 cents per 1,000 feet, provided it gave the same yields of gas that Douglas fir will give. The gas would be better than Riche gas, however, by 160 B.t.u. per cubic foot, and allowing for this difference, the cost would still be greater for materials, since 320 B.t.u. in 480 B.t.u. gas costing 25 cents, would be nearly 17 cents.

I may say, however, that gas having the higher value in heat units is worth more for town distribution, unit for unit, than the other, since it is more desirable in domestic appliances and is cheaper to distribute. I suspect that operating and other costs in the process which we have may be less than in a Riche plant, and the further fact that waste wood or peat may be used is also in its favor.

I am very much interested to note from Mr. Bacque's article how satisfactory 320 B.t.u. gas was found to be for domestic use at Three Rivers, P.Q.

We are not quite ready as yet to make public the details concerning our process.

O. F. STAFFORD,
Department of Chemistry,
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Eugene, Oregon, May 14th, 1918.

Manitoba last year co-operated with the municipalities of Portage-la-Prairie, Sifton, Wallace and others in the starting of road improvement schemes totalling an estimated expenditure of $459,000. This work was not all completed last year, much of it being left until after the war, but the more essential parts of the work are now being undertaken, such as the renewal of old bridges and culverts.

The Alberta government has refused the application of Edmonton for permission to discontinue the experimental sewage disposal stations. It is understood that the provincial government will not depart from their ruling which made it obligatory upon the city that sewage could only be discharged into the river on condition that preparations be made to ascertain the best method of sewage disposal, and that within a period the discharge into the river must stop. On this account the city has been spending annually quite a sum in testing the most recommended systems of sewage disposal. The late sewer maintenance superintendent, E. Evans, who had charge of the disposal plants, has already been given notice of dismissal by the city commissioners.