tion has when serving the public." St. Louis Brewing Association vs. City of St. Louis, 140 Mo. 419—37 S. W. 525. 41 S. W. 911.

"A rule providing that water meters might be installed at the pleasure of the water board on the consumer and that after they had once been installed, the consumer could not thereafter return to the flat rate is reasonable and may be enforced where the meter rates are reasonable and no discrimination between consumers is shown." Powell vs. Duluth. 97 N. W. 450.

"The law imposes no duty to insure the property or extinguish fires." Woodberry vs. Tampa Water Co. 57 Fla. 243, 49, So. 556.

The Arizona Commission in fixing rates to be paid to a water company, decided that a mining company desiring a private fire protection system, should be required to pay a fixed demand charge although "the actual water consumed for this purpose is likely to be negligible." Arizona Corp. Com. vs. Morenci Water Co., Public Utilities Reports, 1915, C. 525, 527.

SOME LESSONS AND PROBLEMS*

By F. W. Bricknell
City Engineer, Hull, Eng.

IT may be useful to consider in what way and to what extent the war has left its mark on municipal work.

All the usual services have, of course, been badly hit by the scarcity of labor and material, so much so that, locally at any rate, prices have hardly needed to be considered.

Taking these services in detail, highway maintenance has probably called for the most criticism from the general public. Here the necessity for deferring repairs far beyond ordinary practice has given an opportunity for verifying pre-war opinions.

There was nothing left to learn about granite-sett paving, and scarcely any repairs have been necessary during the war.

Paving Experiences

In regard to wood paving, there has been more cause than ever to regret the extensive adoption of Australian wood, and it could almost be said that the paving with Petrograd redwood has caused no anxiety at all, and will require comparatively little attention before the Australian wood is replaced. About 160 standards of Petrograd deal, purchased in 1915, served for urgent replacements until the middle of 1918, and since that time English oak and larch have been used; but, wherever possible, the old blocks have been turned and relaid on a "soft bed." English larch offers considerable promise as a paving wood. It takes creosote unevenly, and some has been laid without creosoting, but that now in use is being creosoted by the Rueping process. The oak used is, of course, not from long planks, but from "offcuts" and billets.

The Trinidad asphalt paving, referred to in the writer's 1916 paper, has given general satisfaction, and this paving, now known as "Lithocrete," has been selected for the streets to be paved under the "Road and Bridge Program, 1919-20." There were special and local reasons for preferring this paving to the less expensive two-coat work.

Many macadam roads have become less comfortable for cyclists, but none have caused serious complaints. The situation has, in fact, been saved by tar-spraying, and the writer sees no reason to change the opinion he expressed in 1916 that, except where heavy rubber-tired traffic has to be carried, water-bound whinstone macadam, tar-sprayed annually, is far preferable to tar-macadam.

Welding Tramway Rails

The tramways have fully justified the ideas of their designer, the late Mr. White; but rails which have been eighteen to twenty years under traffic are naturally showing wear at the joints. Up to 1916 it had been the practice to pack up a hammered joint until the lowest part was at normal level and then to dress off the projecting portion. This would, of course, eventually have destroyed the rail head, and in 1916 acetylene welding was adopted. In 1918 acetylene supplies were so difficult to obtain that an arc welding set was purchased, and although this involves night work, it seems likely to supersede acetylene, as, so far as can be judged at present, the results are more permanent.

The value of the close anchorage of the rails is very plainly seen now that some of the holding-down bolts have given way. At such places a pumping action is set up with more or less subsidence of the rail.

Of new developments during the war it is only necessary to mention food production and national kitchens.

Allotments and War Gardens

While every possible effort was made to obtain additional allotments, it was necessary to accommodate about 1,850 applicants on war plots. With one or two unimportant exceptions the owners of the land gave every encouragement, and no rent was paid by the corporation except for land already earning rent. For the most part the plots were let off in batches to a "principal tenant," who paid an acknowledgment of one shilling. In most cases the tenants did all their own work, but in some cases fencing, drainage, etc., was done and an additional rent charged.

The difficulty with regard to allotments proper was that all suitable land was regarded as ripe for building, and the owners would not tie it up for a period of years. It was found, however, that tenants were quite willing to take the risk of disturbance for building, and a number of leases were entered into for periods up to ten years, with a provision that the owner may resume possession at short notice for *bonâ-fide* building development without payment of compensation. After a time an officious person discovered that tenants could not contract out of the Act, and since that time no further land has been taken. The total area leased during the war was about 170 acres, let off to about 2,176 tenants. The rent paid by the corporation varies from £2 10s. to £5 per acre, and after paying for fencing, drainage, road-making and water supply, it is necesary to charge rents varying from 10s. to 12s. 6d. for a plot of $\frac{1}{16}$ acre.

Every possible assistance has been given to occupiers in the way of free literature, lectures and advice, the supply of manures and lime at wholesale prices, and the spraying of potatoes at less than cost.

National Kitchens

While it is to be hoped that no lesson is required for the future, it is probable that existing national kitchens have a long life before them, and there is no doubt that in many districts their catering offers a welcome relief from the intolerably bad private catering.

The principal point of interest about the Hull kitchens is the policy which was pursued of taking over existing shops which were finding a difficulty in obtaining supplies and installing the tenants as managers. Generally speaking the arrangement has been a great success, one branch in particular yielding very large profits. The policy fell short of obtaining the best results because, on the one hand, it was not fully developed before the need was past, and not enough branches were opened to keep the central kitchen fully occupned; on the other hand, the branches needed a supply of confectionery and sundries to keep them occupied for the full day, and it was only after considerable delay that a bakery was rented and set to work for this purpose. The committee has, however, every reason to congratulate itself on the success of its policy, and it is all to the good that when times become normal their managers will be able to resume their old businesses with improved premises, wider custom, and some useful lessons.

Turning to the future, there are three sets of problems which are exercising the minds of most municipal engineers. The most conspicuous of these is, of course, housing, as to which the writer does not feel himself in a position to speak, as his connection with it is confined to the construction of streets and sewers. Here it is necessary to face those problems of routine work which are concerned with giving the ratepayer satisfactory services at not too great an increase

*Paper read before the Institution of Municipal and County Engineers, July 26th, 1919, in Hull, England.