APPENDIX.

Since, as has been shown in this bulletin, we cannot look forward to using electricity for fully coping with the heating requirements in the cold Canadian winters, and must, therefore, continue to rely mainly on fuels, it will be of interest to consider the relation of these two commodities to the needs of the community for mechanical power for industrial and other purposes.

It can be readily demonstrated that, of the total energy in fuels, at the present time and under the most favourable conditions possible in the largest and most modern plants, a maximum of 12 to 15 per cent is obtainable in the form of mechanical power; this is only about one-third of the percentage obtainable in the form of heat in the average house furnace, and only about one-fourth of that obtainable in the form of mechanical power from the water-power of an hydro-electric plant. Moreover, it can be shown that there is no hope of ever getting more than perhaps 4 or 5 per cent greater efficiency than this 12 to 15 per cent in converting the energy in fuels into mechanical power.

This fact, taken in conjunction with those already given regarding electricity, leads to the conclusion, *that, so far as is practicable*, fuels should be used for heating, and electric energy for mechanical power.

This argument regarding electric energy applies whether in relation to motors in factories, etc., or on street cars, electric railways, etc.

True conservation, therefore, lies in using, to the fullest practicable extent, water-power for the generation of mechanical power and fuels for heating. Where no water-power is available, then the fuels must, of necessity, be used for mechanical power purposes, but this will preferably be done in large electric generating stations, the electric energy from which will be converted into mechanical power by means of electric motors, and again the fuels should preferably be used directly for the purposes of heating without converting their energy first into electricity and then into heat.

The question of using electric energy for mechanical power purposes has been taken up very seriously in England since the war broke out, as a means of conserving coal supplies. The Coal Conservation Sub-Committee of the Reconstruction Committee of Great Britain in a report presented to Parliament on April 17, 1917, on Electric Power Supply in Great Britain, states:—

> "Power may be most efficiently applied to industry by the medium of electricity.... The question which has been settled conclusively during the past fifteen years is that the most economical means of applying power to industry is the electric motor, which, on account of its high efficiency, has ruled out all rivals so far as the workshop itself is concerned. In the factories put