from the Rocky Mountains, containing a large percentage of moisture. They thus have a lower heating value than the fuels from the mountains, and furthermore when, after being mined, they are exposed to the atmosphere, they dry out to a certain extent and in so doing crumble to pieces or even fall to powder, so that they cannot be readily handled and will not bear transportation. Such being the case, if these fuels are to be made available for household use, they must be briquetted, or if they are to be used for manufacturing purposes, they must be either briquetted or used in gas producers.

A series of trials of Canadian fuels recently carried out by Dr. Porter and Prof. Durley, of McGill University, for the Mines Branch of the Department of Mines at Ottawa, show that these fuels of the plains are excellently adapted for use in the gas producer and are thus well adapted for the production of power. The question as to whether they can be briquetted when necessary at a sufficiently low cost to make the enterprise commercially profitable, has not yet been established. Fuels of this general type in Germany are briquetted on an enormous scale, and the United States Bureau of Mines is now investigating the possibility of briquetting the lignites of North Dakota. Any lignite can, of course, be briquetted if a suitable binding material is employed. This, however, entails additional expense, but many of the German lignites and some of those occurring in North Dakota can be briquetted without the addition of any binding material. It is thus very important that an investigation should at once be made into the question as to whether there are not, among the great deposits of fuel underlying the Canadian plains and outcropping on their surface some at least which can be worked for the production of a cheap briquetted fuel which will stand transportation and thus supply a need ever more insistant as the population of the prairie provinces increases. Such an investigation is to be commenced next summer by the Mines Branch of our Department of Mines, and the results will be awaited with much interest.

Another source of waste in the case of our fuel supplies is represented by the smoke nuisance which is now becoming very pronounced in our large cities. While it is difficult to prevent the smoke rising from the chimneys of private dwellings—this in the cities of Canada is relatively small in amount for, as a general rule, hard coal is burned for domestic purposes—on the other hand, the immense volumes of smoke emitted from the stacks of many of the great power plants and factories of our large cities as well as by locomotives and steamboats can be greatly reduced or stopped by the installation of proper smoke consumers operated by firemen who have been instructed in their proper use. Investigations show that such plants in many cases at least not only stop the smoke but pay the owners.

The waste of fuel, however, is but a small part of the loss entailed by the smoke in our cities. It disfigures buildings, impairs the health of the population, renders the whole city filthy, destroys any beauty with which it may be naturally endowed and tends, therefore, to make it a squalid and undesirable place of residence, and this at a time when economic influences are forcing into our cities an ever-increasing proportion of our population. These conditions press especially on the poor who must reside in the cities and cannot escape from these evils by taking houses in the suburbs. After all, the conservation of humanity is even more important than the conservation of coal.

Investigations into the best means of abating the smoke nuisance have been and are now being carried on by government and municipal commissions as well as by private individuals in several of the leading countries of the world. Many cities have officials whose time is devoted exclusively to the education of public opinion and the enforcement of existing laws with reference to this matter. The question as to what steps can best be taken to lessen the amount of smoke which is being discharged into the atmosphere in our Canadian cities is by no means a simple one, but the time has come when the Commission of Conservation may very properly make a thorough investigation of the question and ascertain for the benefit of the dwellers in our great cities what can be done to prevent the wholesale pollution of the atmosphere.

COST OF DRILL REPAIRS IN TUNNELING.

IN Bulletin 57, of the U.S. Bureau of Mines, Messrs. D. W. Brunton and J. A. Davis present data relating to the cost of repairs to drills used in the excavation of a number of tunnels in the United States. Briefly summarized, this information is as follows:—

From September, 1905, to March, 1906, hammer drills were employed at the Gunnison tunnel with a drill-repair cost per machine of 13 cts. per foot of hole drilled; but when piston drills were substituted the repairs were reduced to 3 cts. per foot. In addition to the cost of materials these figures include also a charge for the labor of the machinist making the repairs, which is not embraced in any of the values which follow. This fact must be considered in making comparisons. Two years later (September, 1907, to August, 1908), in driving the last 3,000 ft. of the Yak Tunnel, the cost of materials only for re-

Table I.—Cost of Repairs for Hammer Air Drills, Little Lake Division, Los Angeles Aqueduct, July, 1909, to May, 1911.

Name of tunnel.	Distance excavated. Lin. ft.	Total cost of drill repairs.	Cost of drill repairs per foot of tunnel.
1B, south	1,030	$160.39	$0.156
2, north	926	180.72	.195
2, south	419	64.75	.154
2A, north	460	46.28	.100
2A, south	375	55.50	.148
3, north	864	113.60	.131
3, south	2,149	505.01	.235
4, north	448	67.03	.149
4, south	725	215.48	.297
7, north	1,911	399.70	.209
7, south	1,024	493.46	.482
8, north	225	146.56	.651
8, south	1,334	530.52	.398
9, north	777	230.51	.297
9, south	2,479	404.94	.163
10, north	2,626	585.78	.223
10, south	1,776	577.24	.325
10A, north	1,373	303.06	.221
10A, south	1,756	359.27	.204
Average			$0.24