# HEAT *and* POWER *from* STRAWSTACKS

By WESTERNER

TWO facts prevent the accompanying narrative from being classed with the fictions that literary people dream about science. The author is C. O. of a well-known Canadian battalion recently gone overseas. A practical test of the Canadian inventor's new H. L. P. device was made before the Grain Growers' Convention last February. We are not told how the machine works, but further tests, we understand, are being made in Montreal. Opinions seem to differ as yet about the cost of the apparatus.—Editor.

COAL at $10 and upwards a ton is rapidly becoming a luxury to many people. When nature converted primeval forests into coal mines she paid no heed to population. She put all the coal in a few places expecting mankind either to live close to the coal or to invent some system of transporting it that wouldn't put the price as high as the coal is low. Here and there just to help the problem out a little she put waterfalls like Niagara, capable of generating heat, light and power. But she carefully refrained from putting great coal mines or great water-powers on the prairies; so that prairie people have always been at some disadvantage in the matter of fuel.

And here is where the discovery of George Harrison fits into a scheme of economy. In the North American West, on the pampas of the Argentine, and on the steppes of Russia, men have for years toiled to produce bread for millions of human beings. The grain having been threshed and sold, they had to find some way of disposing of the surplus straw which was not required for fodder or litter. The easiest and cheapest way was to apply a match, and this they proceeded to do at the first opportunity—when the air was still and the straw sufficiently dry.

Then some enterprising machinist attempted to evolve an engine that would utilize straw to produce the necessary power for threshing grain. He succeeded fairly well, but the work of handling the fuel was great and it did not become popular. Another genius conceived the idea of pressing straw into cordwood and then burning it as household fuel; but this was no more successful and the straw continued to be disposed of (according to the play) "the easiest way."

THE Canadian Pacific Railway Company employed scientists to discover uses for the waste straw. Experiments have been made for years in an attempt to utilize this waste product, but with little success. The burning straw stacks continue to illumine the horizon during autumn and early spring as the farmer "cleaned" the land for the next crop.

So—along comes George Harrison. He was born on shipboard off the coast of South Wales, and in time took his degree of Master of Engineering from the Cardiff University. Nothing was more natural than that he should turn to the sea again for his living, and for many years he was assistant and later Chief Engineer on one of the White Star liners. He afterwards drifted to the great western prairie, to Moose Jaw, Sask., familiarly known as the "Railway Town," and later, the "Mill City" gave him the opening he sought. Beginning as Manager of a small machine and carriage shop, he at last became President and Manager of the Saskatchewan Bridge and Iron Co., Limited, the first big bridge shop between Winnipeg and the Coast. One only has to look at "George"—as he is known to all his associates—big, broad-shouldered, with keen eyes and genial face—to see him in the midst of his machinery, noting a weakness here, or an untrue bearing there, recognizing that a certain machine is not producing enough money, to realize that the confidence of his associates and of his employees is based on the fact that he knows and can do things.

In the earlier days, part of his business was to go out into the country among the many straw stacks, to repair some of these engines that consume straw and he was forced to stay sometimes in "Shacks"—the colloquial name for the palatial two-roomed dwellings occupied by many of the homesteaders who have to haul their wheat perhaps twenty-five to forty miles, where the fuel used was straw.

Many times the threshing season is short and the farmer's day is prolonged until night-fall, and as George watched the engines swallowing straw, he noted the blue flames from the smoke stack mingled with the smoke and he wondered—and pondered.

Later, at another farm, he was invited into a shack by the proprietor, who proceeded to fill up his sheet-iron homesteader's stove with straw, for the evening was cold. A few minutes later, puff! bang! off went the roof and out went the doors and windows, and they found themselves staring at the ruins of the stove and building, wondering what had happened.

But the shock had opened the Engineer's eyes wider than ever before and they did not close again. He no longer wondered—he knew.

Now you will see the reason for the long preamble on straw-stacks, straw-burning engines, and straw-burning stoves, and you will understand why the Grain Growers, with their wives and families, gathered together in thousands at Moose Jaw in February, 1917, for their Annual Convention, stood amazed to see the despised and cumbersome straw-stack producing heat, light and power of the very finest quality, and at a cost which was a veritable joke.

Four years of patient work had solved the problem and now the "down-trodden" owner of 160 acres had a vision of a house lighted, heated and provided with cooking power from his own farm—power for his grinders, his pumps, his threshing-machine, yes, and even for his automobile—from the old straw stack. The demonstration plant showed him the gas being produced from the straw bale, being scrubbed and washed—and then he could watch it lighting the gas mantel, heating the furnace, the tea-kettle, the gas log, and the incubator—see it driving a power engine for the grain crusher and the washing machine, and more, find it generating electricity that would give him the same light used by the man in the city.

The possibilities are limitless, but the experimental stage has been passed and the miracle has been wrought. One ton of oats, barley, or wheat straw (and flax straw is still better) will produce 50 per cent. more gas than a ton of the best gas coal in the United States or Wales, and the quality of the gas is far superior, containing three times as many B. T. U.'s as coal gas, being absolutely clean and non-poisonous. 20,000 cubic feet of gas can be drawn from one ton of straw, while the best coal will only yield 14,000, and the cost of reduction is almost nil. Twenty tons of straw will yield enough gas to heat, light and cook for the average seven-roomed house for a year, and when you consider that one hundred acres will produce at a low estimate 200 tons of straw, the cheapness of the fuel becomes apparent.

The cost of the producing plant for the average farmer is less than that of a sheaf-loader, and little, if any more, than a team of horses. The whole apparatus can be operated by a child of ten years; in fact, it requires no operation but the handling of the straw.

The farmer can now sit down before his gas-grate, and read his paper by the light from his straw stack, while his wife can operate the washing machine or churn without labour and get the kettle boiling in five minutes without soiling her hands. Think of it—no work, no coal to carry, no ashes to take out, no soot to clean from the oven or the grates, no black kettles or pans, for the gas will not make even enough soot to soil a handkerchief.

When supper is over he can take his family to town in his car without having to buy gasoline, no carbon in the cylinders, no dirt in the carburetor, no electric light wires to give out, for power and light may be drawn from the one tank, and that inexhaustible while grain grows on his farm.

The village may instal its own light and power plant and run it with fuel supplied from the surrounding farms—no heavy expense for fuel, no coal shortages. The cities may run their factories without the black pall that hovers over the coal-fed furnaces of the industrial towns, and the housewife need no longer go through her spring house-cleaning every month.

AND this is only a part of the miracle. I said that the gas had to be scrubbed before being used. The by-product of the straw is a tar of which the properties are varied and invaluable. Aniline dyes, disinfectants and medicinal drugs are among the known and proved utilities to be extracted from this by-product, and the yield of tar, about ten gallons per ton of straw, is sufficiently large to render it commercially valuable.

But unlike the pig in the packing house, even the "squeal" is valuable, and the "char" that is left after the gas has been drawn off, is highly valuable for briquetting into coal for fuel, or it may be pulverized and fed into a gas flame for the production of a high degree of heat.

In 1916, the Prairie Provinces produced on the conservative estimate of two tons per acre, thirty-two million tons of straw with a gas-producing power equal to forty-eight million tons of the best gas coal or sixty-five million tons of ordinary coal, or enough to supply the total fuel demand of the same provinces for seven years. At the same time it must not be overlooked that the gas contains three B. T. U.'s for every one in coal gas, so that the heat-producing power of one ton of straw is equal to four and one-half tons of good coal. Even under present conditions, the straw can be compressed (at less than the cost of mining coal), into such a small space that it takes no more than coal in a car, ton for ton. This means that one and one-half times as much gas-power can be delivered at the same freight rate as that of coal, while the heat-producing capacity of the gas is three times as great as that of coal gas, which means that four and one-half times as much heating power of straw gas can be shipped in the raw state, as could coal gas.

Already the Grain Growers' Association of Saskatchewan is combining with the Associations of Manitoba and Alberta to provide this equipment for the farmers and others in the Western Provinces, and with the production of sufficient machines to satisfy the enormous demand, the death knell of the high prices for coal, gasoline and oil will sound.

One of the eminent English scientists who investigated the discovery, declared his opinion that the high cost of heating and lighting for the West and for a great part of the Dominion, had been solved.