

ON HER MAJESTY'S SERVICE

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FRONT COVER: "Nasturtiums," by *W. H. Wilson* (General Chemicals Division)

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GUNPOWDER FOR WATERLOO

Two months ago I.C.I.'s oldest factory closed, after making gunpowder for more than 150 years. Up to the end the mills made gunpowder the old way. The waters of the valley were still harnessed for power; and in the "modern" extension a Watt beam engine still functioned efficiently. Now the cruel task of dismantling begins.

By Michael Danckwerts

1484



By Michael Danckwerts

TEN miles south of Edinburgh is the perfect "undiscovered" beauty spot for which picnickers are always searching. At the bottom of a densely wooded glen a river tumbles over rocks in sunlight dappled by overhanging trees; families of rabbits skip about, a kestrel hovers beside its nest in the face of a cliff, and a woodpecker calls from a hollow oak.

For more than 150 years this idyllic scene has been reserved for the eyes of a few score men and women—the skilled workers who have made gunpowder at Roslin Mills, a handful of stone buildings scattered through the glen. And although the mills have been closed since June, the notice that has stood at the head of the glen since 1790, "Gunpowder Mills—No Admittance," still stands there to warn off small boys, who might find material for mischief in the abandoned buildings.

Roslin was not only I.C.I.'s oldest factory, but the oldest privately owned gunpowder mill in the country. The decision to close it must have been a hard one for Nobel Division to take. But early this year it became clear that temporary expedients such as shoring up could no longer stave off the subsidence, caused by coal mining, that has been nibbling at the factory buildings since 1942. Roslin was dangerous, and had to close.

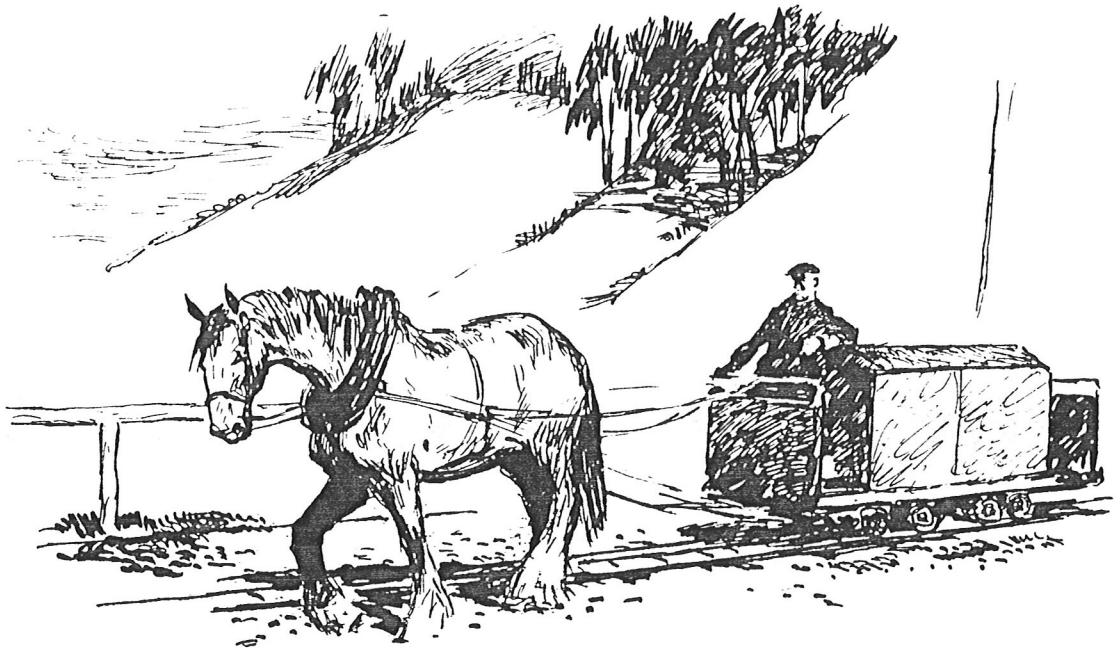
It was a sad business for everyone, from the works manager down to the three brass-shod horses that plodded loyally round the works with their wagons of gunpowder.

Thomas Crow, the searcher at the gate, had been at Roslin for 30 years; William Russell, the superintending foreman, for 25. Peter Wilson, the joiner, had been there since 1914 and had gone to school from a house in the factory grounds where his stepfather, Thomas Penman, lived. Penman had been superintending foreman in those

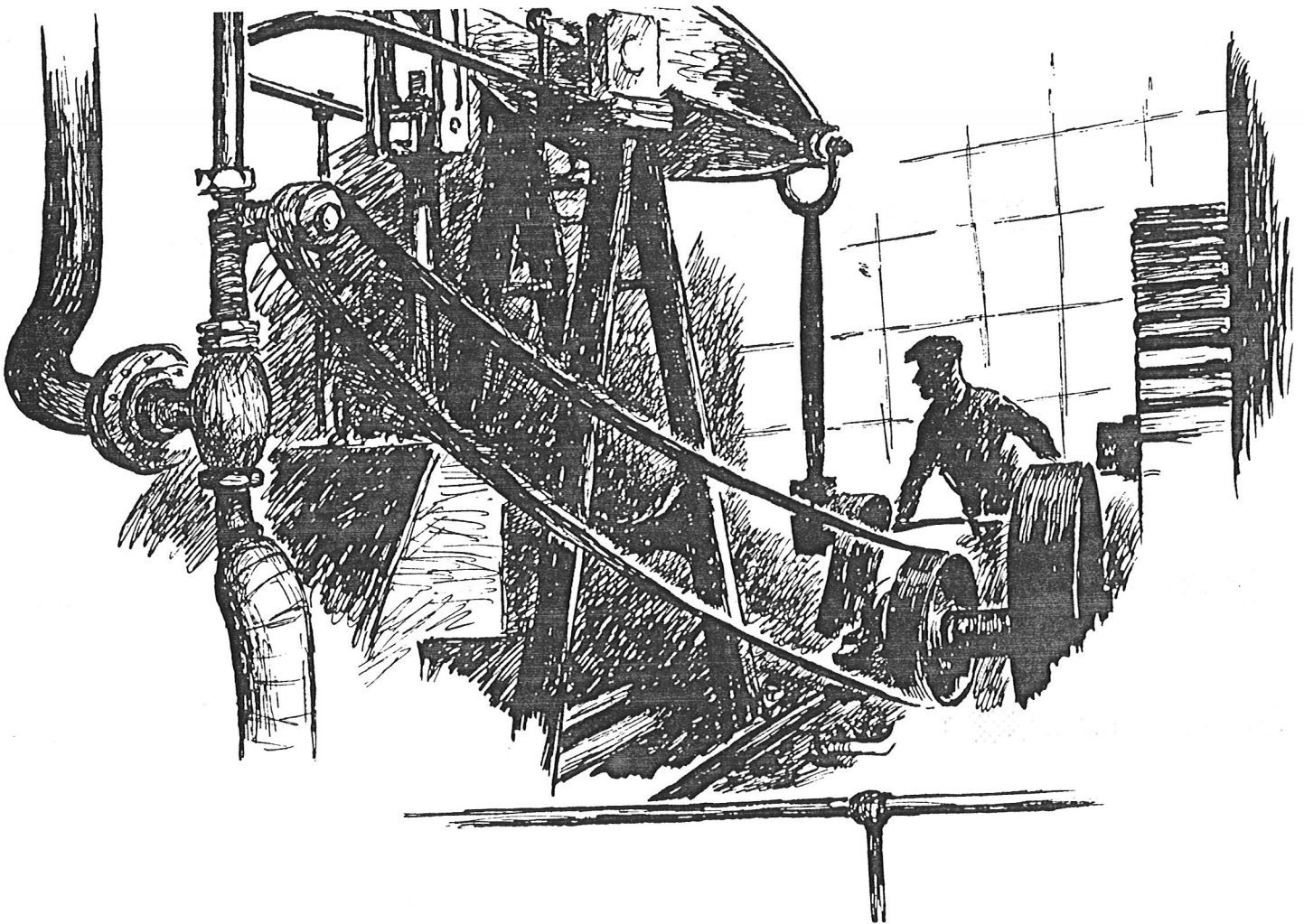


One of the chain of blackpowder processing sheds at Roslin

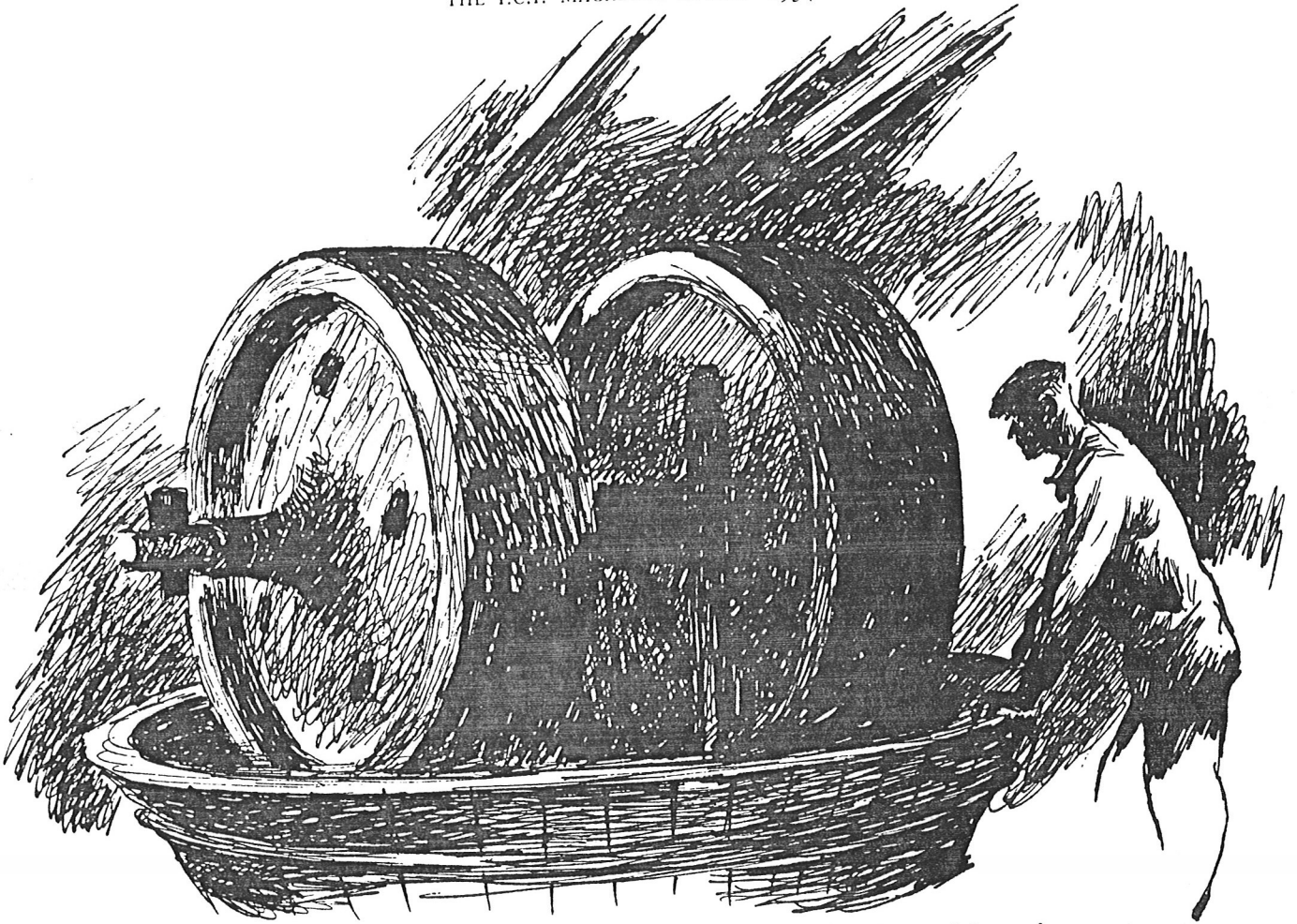
Drawings by Arthur Horowicz



Horse-drawn wagons were used for the carriage of blackpowder or its ingredients



This steam engine was bought second-hand in 1863 and is believed to date from the earliest days of steam power. It continued working efficiently until the works were closed last June.



These edge-runner mills were the heart of the process. Here the mixture of charcoal, saltpetre and sulphur was ground into a fine powder and thus became explosive.

days, and *his* father had worked at Roslin before him. Peter Wilson told me that in his stepfather's day it had been a factory rule that when the men came to work they combed out their beards in front of the searcher to prove that there were no matches hidden there.

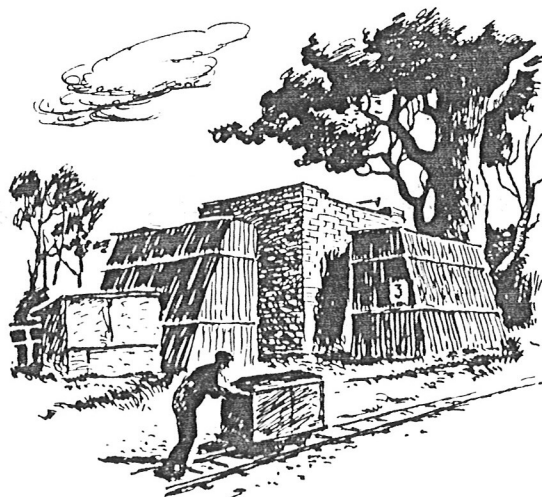
Mr. A. T. Tyre, the works manager, lived in the Adam brothers' house above the glen that John Merricks had built when he started Roslin in 1790 with his partner John Hay. Hay and Merricks' original office building in the works was still intact, though used as a women's changing room. Mr. Tyre pointed out on a rock the figures 1815 carved a foot high. "That means Roslin powder was used at the battle of Waterloo," he said. "Or so the story goes." And it is not difficult to imagine a jubilant powder-maker using his dinner hour to record Roslin's contribution to the famous victory.

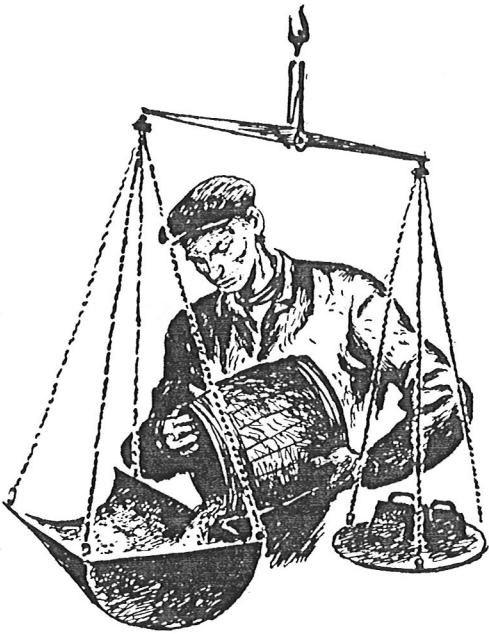
The use of Roslin powder for guns had ceased, of course, long before it became an I.C.I. factory. But from a loft above the stables William Russell unearthed a dusty bunch of reminders of the days when the powder was used against game, Boers and Bashi-Bazouks: muzzle-loading and flint-lock guns, kept for testing purposes in the Curtis and

Harvey days. Nowadays black-powder, as it is called, is used chiefly by shale and slate quarriers, who like its gentle effects best for their blasting work.

No chemical process can have changed so little since 1790 as the making of blackpowder. In twentieth-century Roslin charcoal, saltpetre and sulphur were the three ingredients, as they were in 1790, and, as in 1790, they were wrought into an explosive mixture largely by water power from the river North Esk.

The charcoal, once burnt from





Weighing out the ingredients for the blackpowder mixture, technically known as the "green charge"



Blackpowder is here being pressed into pellets. The demand for blackpowder in pellet form comes chiefly from shale mines.



Blackpowder is chiefly needed in the form of grains. For this the powder at Roslin was first pressed into cakes, which were broken up by hand with a wooden mallet and then further reduced in size by a "corning" machine.



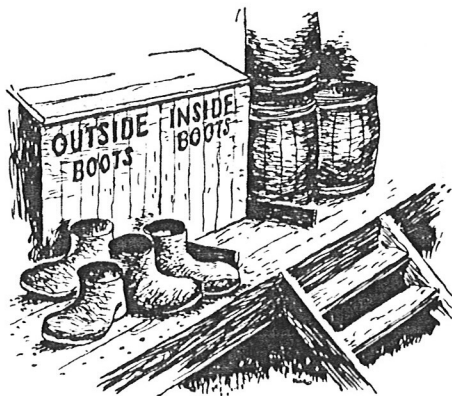


One of the original water wheels dating from 1790. This old paddle wheel drove twin edge-runner grinding wheels, each housed in a separate shed on each side of the wheel.

alder wood growing in the factory grounds, was supplied in recent years from Ardeer with the other ingredients. After a preliminary hand mixing, the ingredients, known as the "green charge," went to incorporating mills. Merrick's original pair of mills driven by a paddle wheel mounted between them, were still in working order when Roslin closed down. But since 1863 four of the mills had been powered by a vast beam engine, bought second-hand and believed to date from the early days of steam. Four other mills were worked by enclosed water turbines.

These edge-runner mills were in effect like gigantic pestles and mortars, the pestle in each being a 5½-ton wheel of chilled steel. "Quite a modern machine," Mr. Tyre said, pointing to the date on one of them, which read "Falkirk, 1885." He explained that the milling process was potentially dangerous. An old nail or a few grains of sand in the charge could spell disaster. For that reason there was not only a very strict sieving and magnetic screening of the raw materials, but a charge igniting in one mill would automatically operate a safety device which drenched it and the contents of the other mills.

The next stage in the process, as of old, was to compress the wrought powder into cakes. A modern hydraulic press had taken the place of water power here, and with a pressure of 1½ tons to the square inch could turn out 30 cakes of powder, each two foot square, every 35 minutes. As the men in the press house removed the cakes they broke them up roughly with mallets. Kegs full



of broken cake then went to the corning house.

Corning—the breaking of cake into grains of exactly the right size—was a process that claimed more than one life in the old blackpowder industry. The original owner of Roslin mill would have been amazed to see what precautions against accidents had been evolved since his day. The corning machine itself, built of wood and non-ferrous metals, was housed in one shed, its engine in another. The processman could not start the engine without leaving the corning shed, and was therefore never in any danger of being near the machine when it was running. Nor could

anyone else start the engine while he was in the shed, for only a unique key, held by him, would unlock the engine compartment. An indicator outside the shed told him when each batch of cake had been cornd, whereupon he would stop the engine and re-enter the corning shed.

The uniform grains of powder from the corning machine then went to be glazed with graphite in revolving drums. The polish they acquired made them flow more easily and gave them a certain resistance to water. Part of the output of powder from the incorporating mills, instead of being made into cakes and cornd, went straight to the pelleting sheds. Here women workers, operating rotary pelleting presses, turned out brick-hard pellets of compressed powder, used chiefly for blasting in shale mines.

William Russell took me down the lane that ran past the pelleting sheds to the farthest boundary of the works. A main road once ran past the boundary at this point, and an eighteenth-century house that had once been an inn was now inhabited by the works chauffeur, William Mitchell.

In another ancient building William Lorimer, the cooper, worked alone, as he had done for forty years, making kegs from oak staves.

As we walked back up the lane William Russell surveyed the sunlit stretch of river and voiced feelings that must have been shared by many when Roslin closed down. "Look at the beauty of it!" he said. "I could have worked here happily all my days."