

ENGINEERING—GEOLOGY

Coal Mine in a Museum

In the Heart of Chicago You Can Now Visit a Full-Sized Coal Mine With All Machinery and 20 Men to Run It

By DR. FRANK THONE

GOING to see a museum used to mean walking endless foot-hurting leagues between depressing rows of glass cases, looking with varying degrees of interest—or boredom—at the stiffly stuffed animals or exceedingly dead-looking fossils or mineral specimens within them. Small wonder that museum-visiting came to have a dry and dusty connotation, and that only the more determined pursuers of culture were regular devotees of this unexciting indoor sport.

But all that is changed now. A museum of that sort would be a curiosity to the museum curators themselves now, and if they could find a place like that they would exclaim over it with as many grins and chuckles as we all do over some semi-antique which we can just barely remember in its heyday, such as an opal-glass figure of a pug dog like the one Aunt Minnie used to keep on the what-not. The old-time dusty museum is as dead as any of the stuffed specimens it contained.



THOROUGHLY MODERN

The very latest mining machinery is operated for those who inspect the coal mine in Chicago's new Museum of Science and Industry.

The new idea in museum management is to keep its stuff as much alive as possible. If they have stuffed animals, they are mounted in life-like postures against a natural-habitat background, and they look out at you as though your coming had startled them into momentary still, alert attention. Similarly, if the museum undertakes to show old-fashioned machinery, or demonstrate principles of physics and chemistry, the machines and models will actually *work*: you push a button and they do their stuff.

Everybody's Desire

It has remained for the newest of America's great museums, the Museum of Science and Industry in Chicago, to capture a specimen of a whole major industry and install it within its walls, keeping it alive and working. For this museum has caged for your interest and better understanding a full-sized coal mine, an exact duplicate of one of the great mines of the famous southern Illinois bituminous coal district. All the modern labor-saving machinery and life-saving safety devices are there for you to see, and real miners in their working clothes are there to work them for you. A trip through this coal mine in a museum will help you greatly to understand how the commonest of our fuels is wrenched from its age-long repose in the depths of the earth and brought to the surface for our use.

The choice of the Museum of Science and Industry is a happy one. Of all the kinds of industrial plants there are, they could hardly have selected one more popular. Everybody has wanted, at some time or other, to go down into a coal mine. But the wish is not easily granted. Coal mines are busy places, and visitors are quite frankly in the way. Besides, actual coal mines are usually wet and slippery, with uncomfortably low spots in the roof where you can't find a spot to stand upright. Added to this, there are the dozen dangers that always hang at the heels of miners—explosions, rock falls, machinery gone wrong—which are bad enough for the working force to contend with, but would be much worse if one of them happened to

trap a visitor. So as a rule we never get to see a coal mine.

It is this that makes the Museum's choice such a fortunate one; we can satisfy a life-long curiosity without bothering busy men and without inconveniencing ourselves. The Museum intends to install other full-sized samples of industrial plants later, as its expanding floor space permits. But it is a good thing that the mine came first.

As you enter the Museum, the coal mine is the first thing you see: it ends the vista down the main axis of the building. It towers aloft under the high roof just as its prototype does under the higher dome of the southern Illinois sky. This tower that is the center of the above-ground works of any typical coal mine is really the head of a great elevator shaft; in mining parlance it is called the "tipple." At one side is the engine-house where the hoisting machinery is sheltered; you can see the cables running aslant to the head of the tipple, where they lie in the grooves of great pulley-wheels that direct their vital work of lifting the loads of coal all day long, and of the men who mine it when they come up at night for supper and bed.

To go down into a mine you have to begin by climbing a short flight of stairs. This brings you to a door, which opens into a cage, not unlike that of an elevator in an office building—except perhaps that it is not quite so "fancy." At a signal, the operator shoots the cage downward. Down, down, down you go, hundreds and hundreds of feet. In an actual coal mine you might descend half a mile or some such matter.

A Stage-Curtain Trick

In this coal mine in a museum, of course, it is not necessary to make so great a descent. And in this particular location, as a matter of fact, a deep shaft would hardly be possible. For the Museum of Sciences and Industry stands on sandy land near the shore of Lake Michigan, and a deep shaft would be merely a deep well—they would have to be pumping against the Great Lakes to keep it dry. So they compromise by treating you to most realistic illusion. The cage drops more slowly than it seems to be going, and at the same time the apparently solid walls are pulled rapidly upward past your eyes, running over rollers like stage curtains. So real is the

illusion that many visitors insist that they are hundreds of feet under ground when they step out of the cage.

At the foot of the shaft you find yourself in the very heart of the mine, the center of its whole circulatory system. Here the coal is brought in trains of small cars hauled by an electric locomotive—for the old-fashioned mine mule, that cave-dwelling animal that never saw the sun, is long since departed from modern mines. Such a train has just come in as you leave the cage.

As you watch, one of its cars slides forward onto a section of track over-arched at either end by a high circle of steel. A man sitting by a machine with a dial presses a button. Instantly the track section, car and all do a side roll before your eyes, turning the car completely upside down. The coal spills out into a pit, invisible below, with a terrific crash, and you begin to realize what a noisy business coal mining is. The pointer of the dial leaps halfway round its face, a bell goes "ding!" and you see a sheet of paper slide along with a newly-printed purple-ink "4000 pounds" on its face. The whole proceeding has been an automatic weighing of some miner's two-ton loading.

More Water Than Coal

The coal, your guide explains to you, has fallen into the weighing-pan of the scales, recorded its weight, and then been dumped out again into a container at the bottom of the shaft, called a "skip." (If you remember your Icelandic, you will recall that is the ancient Norse word for "ship," and wonder if it has anything to do with the case.) The skip, when full, takes a ride to the top of the tibble, where it is either dumped directly into a waiting coal car or truck, or, if it is to be sold as some grade other than "mine run" coal, it is delivered over to the various screens and washing machinery that elevate it to its proper place in the aristocracy of carbon.

Your guide now calls your attention to a couple of pumps that are greedily sucking away at a pool of black water in a pit which he calls a "sump." This is the lowest part of the mine, into which all the water eventually drains. Almost all coal mines are wet, and if the pumps do not keep laboring day and night the mine will be filled with water and ruined. Pumpmen therefore are among the veritable high priests of mine mechanics. In even the bitterest labor wars they stick to their posts without approach from their striking comrades,



CLEAR TRACK FOR VISITORS' SPECIAL

—in the heart of the coal mine of Chicago's Museum of Science and Industry. Visitors in the mine car are waiting for their engineer to phone ahead that the train is coming. The walls of real coal and the ceiling of limestone were moved from a mine of the famous Southern Illinois field.

for they must save the jobs for the miners, as well as the mine for the "boss." The importance of the pumps is better realized when your guide tells you that in some mines more water than coal is lifted to the surface.

But a train of two caged-in cars, holding a party of about thirty persons, is waiting, and your guide sees you all seated. In such cars miners go to work in the morning and come back at night, for in a really big coal mine like this one there are underground streets as extensive as those of a good-sized town. The ride lasts for many minutes, passing openings into side-passages where you can see miners hard at work. Here again the apparent distance covered is increased by a clever illusion trick.

There is, however, no illusion about the coal you see on the walls, either at the foot of the shaft or any other point where you stop to see how the machinery works. It is all real coal, brought from the high-grade bituminous field in the southern part of the state, and built into the walls.

As you ride along, safety doors open before you and close after you have passed. But at last you come to a wider space—a "room" as the miners call it, where one of the tremendous machines that has so largely replaced human muscle-and-pick work has been gnawing into the coal.

It is a squat, massively built steel monster, and projecting from its forward end is a weapon that looks like a

sawfish's saw, multiplied by ten. The tough steel teeth that edge it, however, are mounted on an endless chain, so that when this terrific implement is shoved against the face of the coal wall they gnaw right through it, cutting a deep gash. This blade can be turned in any direction. Its usual method of working is to make a horizontal cut under the coal at the bottom of the seam, and then one or more vertical cuts deep into the face of the coal.

This leaves the coal hanging to the roof, ready to be blasted down. Alongside the cutting machine is a coal drill, ready to bore a deep hole into which the dynamite cartridge can be inserted. For safety's sake, Illinois law requires all "shots" to be fired at night, when the miners are out of the mine. Then in the morning they can pick up the pieces and load them into the cars.

Much of the picking up is done by another massive machine, whose greedy steel jaws, sweeping endlessly and fast, remind one of an enormous beetle as strongly as the cutter did of a sawfish. This loads the cars faster than a dozen strong-backed miners could ever hope to, and then they are pulled away by the electric locomotive, ready for their ride up to the sunlight which first made the plants that made the coal so many, many millions of years ago.

Beyond all question a trip through the coal mine that has been caged in a museum belongs in every body's education.

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