*BURNING FLUID COAL—This forge furnace photographed at Battelle Memorial Institute is fired by fluid coal fed to the burners through the pipe at the left in the same manner as oil or gas.*

ENGINEERING

# Fluid Coal in Industry

**Pulverized and mixed with air, coal can be made to flow through standard pipes and is suitable for many forging furnaces. May relieve fuel shortages.**

➤ "FLUID" COAL, a pulverized form of coal which, when mixed with air, can be made to flow through standard pipes a quarter of a mile long, is being studied by fuel engineers at Battelle Memorial Institute, as a possible substitute for fuel oil in industrial heating processes.

Preliminary work on the application of this finely ground coal to industrial furnaces—which application if widely adopted may have great effect in alleviating shortages of fuel oil—has demonstrated that the fuel is entirely suitable for use in many types and sizes of forging furnaces, that it has advantages of fluidity similar to those of oil and gas, and that it gives flames of high emissivity which provide maximum heat transfer by radiation.

Of particular importance is the fact that for most sections of the country this material would be more economical for applicable industrial processes than the fuels now being used.

Investigations in the uses of pulverized coal have been in progress at the Columbus industrial research laboratory for several years and are now being intensified under an enlarged research program supported by the bituminous coal industry. Emphasis is being placed upon the application of the finely pulverized coal to forging, heat-treating, and other metallurgical furnaces, which now consume great quantities of oil and gas in the war industries.

"Fluid" coal is produced by grinding coal to dustlike fineness in specially designed mills. A stream of air entering the mill picks up the fine particles and delivers them to collectors. The material when not impacted will flow through your fingers and pour somewhat in the manner of a liquid. When mixed with air it demonstrates fluid-like properties, will flow through pipes, and spray out of jets.

That the substitution of pulverized coal for oil and gas in some metallurgical processes is entirely practical is verified by the fact that a number of plants have been using pulverized coal for steel-heating furnaces for many years. In fact, in 1920—in the days before oil and gas became cheap—there were 690 known pulverized coal furnaces in operation in this country. The development retrogressed, however, with the discovery of vast new sources of oil and gas and the sharp reductions in the costs of these fuels.

Investigations by Battelle scientists have indicated that there is great possibility of extending the use of pulverized coal to hitherto unexplored fields. It has been tried in the radiant-tube furnace, which is used in heat-treating, annealing, and enameling, with promising results. The successful application of pulverized coal to this type of furnace would remove the principal disadvantage of coal in refined metallurgical work, namely, the fly ash, cinder, and sulphur, since combustion takes place inside alloy-steel tubes lining the walls of the furnace.

Finely pulverized coal ignited in air burns rapidly, releasing great quantities of energy. A part of the Battelle investigation of this fuel, but one having less immediate application in industry, is the study of a direct means to harness this energy.

*Science News Letter, February 6, 1943*

METALLURGY

## Mirrors Used to Measure Width of Steel Slabs

➤ NOT ALL mirrors are in beauty parlors. Some are in steel rolling mills. There they do not reflect the rosy face of a lady, but the face of a yellow-hot slab of steel as it comes from the rollers.

These slabs must be of uniform width within a half inch or so. They are not in a position to be easily measured with a gauge. Sometimes they are as much as 13 feet in width.

A scale is used mounted in any convenient place, with white lines on a black background. One set of mirrors is arranged to catch an image of the glowing steel and a second set is aimed at the scale. A third mirror superimposes one image on the other. By watching it the operator has a constant check to be sure he is getting a slab of the proper width.

*Science News Letter, February 6, 1943*