of pins. Don't believe them. They may be wise and know a lot—but some of the things they know aint so. That's one of them.

The heat loss due to the presence of the unburned carbon that we call smoke may be directly responsible for from 5 to 10 per cent. of the heat in the coal. In addition, smoke indicates a condition in the firebox that leads to the production of what chemists call "carbon monoxide"—a product of incomplete combustion. This is a colorless gas that you can't see going out the stack; but it's there and accounts for an additional heat loss. Then too, smoke may be accompanied by other colorless gases called "volatile hydrocarbons," which also have a high heat value; and, finally, smoke (or soot) sticks to the surfaces of the tubes and flues, building up a non-conducting layer that retards the flow of heat from the hot gases to the water in the boiler. This not only retards the steaming capacity of the boiler, but increases the temperature of the gases escaping at the front end and accounts for another source of heat loss. Boilers won't steam freely unless the heating surfaces are kept clean—and it is a hard job to keep them clean when the engine is always smoking.

These are not theories, they are facts. If you want to save coal, save trouble and save work—follow the prescriptions and cut out the smoke.

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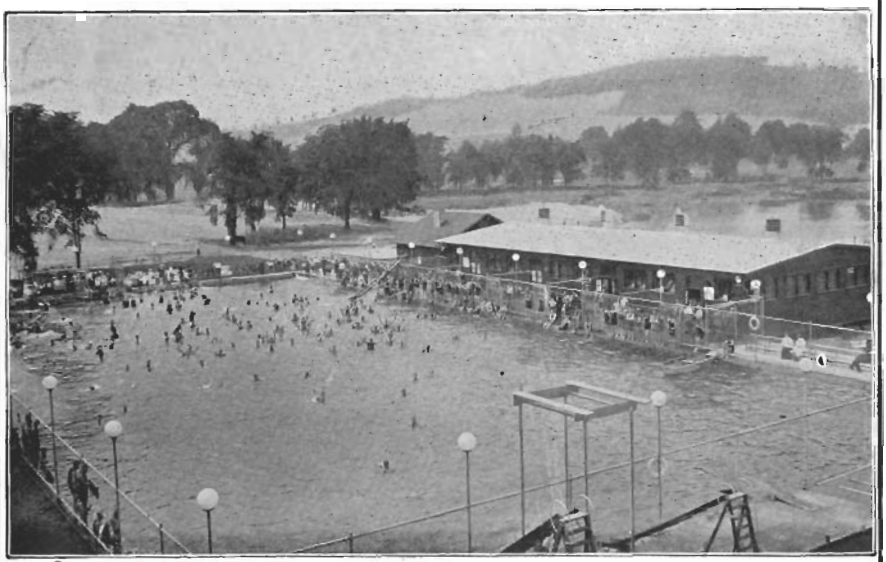

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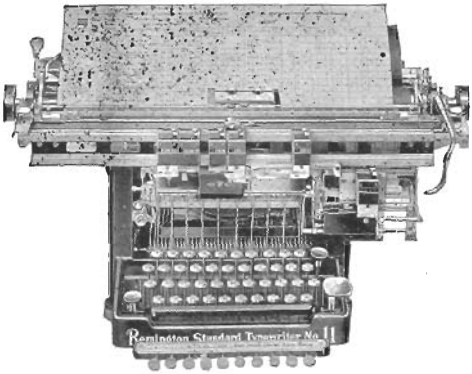

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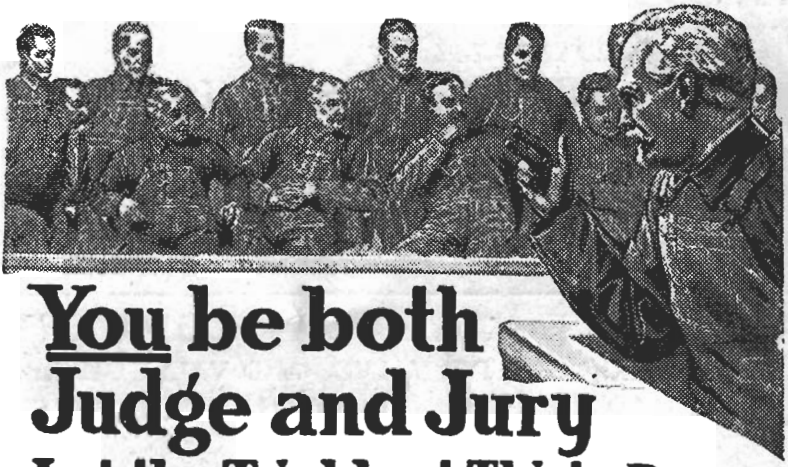

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