



FIRST SERVICE STATION ever built was in Columbus, Ohio, where H. V. Wickliffe, left, catered to motorists' requirements.



ISAAC DAVIS of Dayton, Ohio, revolutionized the industry by designing the first tank wagon.



FIRST oil well, at Titusville, Pa., is dwarfed by giants of today's booming oil fields.

From Coal Oil to 100-Octane

By Dr. Frank Thone

NOT so many years ago, the oil industry placed its greatest emphasis on the production of coal-oil to feed our lamps, ovens and stoves. Today refineries are rushing new plants to produce 100-octane gasoline, to feed our thirsty war eagles.

Unique among the nation's 100-octane refineries is a new one nearing completion at Cleveland, Ohio, for it stands on the exact site of the first oil refinery built by John D. Rockefeller. The place, a shelf on a steep hillside in Cleveland's crowded, smoky industrial district, is still listed as No. 1 of Standard Oil Co. of Ohio.

Here the petroleum industry had its birth, as a national-scale, big-business enterprise. Here its lineal descendant is

ness for sentiment, anyway. Present-day engineers point to a certain place on the slope and say they think that's about where the old skidway was, on which the barrels were slid down to the tracks below. There is one solid-looking foundation of obviously old, hand-pecked red sandstone blocks, now supporting a prosaic corrugated-iron structure. The engineers think that may mark the spot where the old wagon works used to be, where tank wagons were built for the door-to-door and farm-to-farm peddling of kerosene and its by-products.

WHAT a strange world it looks like now—that mid-19th-century period into which old Standard Oil No. 1 made its bow!

Ladies hadn't given up hoopskirts so very many years, and no gentleman would think of appearing in public wearing anything but a stovepipe hat. High-wheel bicycles were the latest

using machinery designed for drilling salt wells. Oil was shipped in whiskey barrels; tank cars and pipelines were yet unheard-of, though not far off. There was less science in oil distilling than there was in the making of moonshine liquor. Oil prices veered wildly from week to week.

Competition between local oil refiners was on the basis of the uttermost go-as-you-please individualism, with no more rules than there were in contemporary bar-room fights. The normal condition of the oil business was anarchy. Only the toughest survived.

Into this chaotic world plunged young John D. Rockefeller, with his new Standard Oil Company. He could see farther, perhaps, than some of the men already in the business. He envisioned a world of stabilized oil prices, of standardized products, of nation-wide sales.

Gasoline, the principal concern of the refinery of today, was only a slightly troublesome co-product of the refinery of 1870. Oil to burn in lamps was the main business then—coal-oil, it was usually called by small boys trudging to the grocery store, lugging a gallon can with a potato stuck on the spout for a stopper. Calling it kerosene sounded slightly affected.

At first, the grocer simply dipped a measure into an open barrel and funneled the smelly stuff into the customer's can. Then came spigots, then metal tanks with spigots. As a final refinement, the spigots measured out the liquid as it flowed directly into the can.

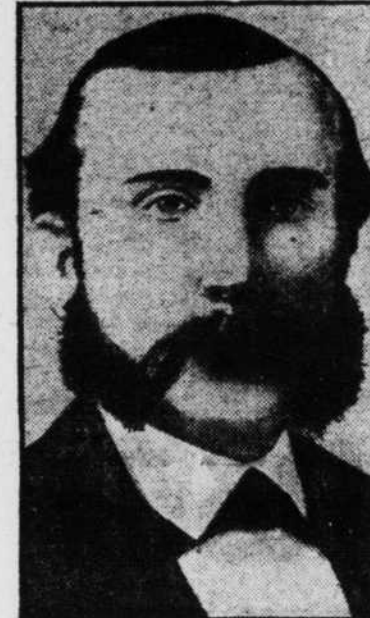
Peddlers carried the business to the customer; first with three or four barrels in an ordinary wagon, then with a metal tank mounted on axles. The driver's cry of "Oil!" brought sunbonneted housewives hurrying out, oil-cans in hand.

GASOLINE didn't sell well except in summer, when people let the coal and wood fires go out in the big kitchen ranges and did their cooking and heated their wash-boilers on gasoline stoves. Gasoline flares lured small fry to the corner set-ups of patent-medicine vendors, or the stands of peanut-and-popcorn men. As the years wore on, stationary gasoline engines began to appear here and there—

loud, bangy, and a bit uncertain in temperament.

This was the world of 1870 and the three or four succeeding decades, upon which the old refinery on the side of the hill looked out. Changes were going on all the time; actually revolutionary changes, many of them. But looked at from this motor-driven age, it is not easy to see at first glance what they were.

SO far as the oil business was concerned, the big change was the invention of the gasoline engine. Crude and bangy as it was at first, it was destined first to put the whole American public on fast, rubber-tired wheels, then to hurl us into the air for



JOHN D. Rockefeller, during pioneer days.

the urgent businesses of peace and war. And, incidentally, the kerosene business lost a lot of its domestic customers with the arrival of easier, brighter household and street lamps—first the Welsbach gas mantle, then really good electric bulbs.

The first World War did much to speed up (very literally) the automotive and aviation industries; but it was as a peach-tree switch compared to a roweled iron spur when it comes to the stimulus applied by the present war. The present types of aviation gasoline are as little

like what we were using six or seven years ago as those in their turn were like the simple, "straight-run" fluids distilled out of the earth's black oil in the old cast-iron kettles of No. 1.

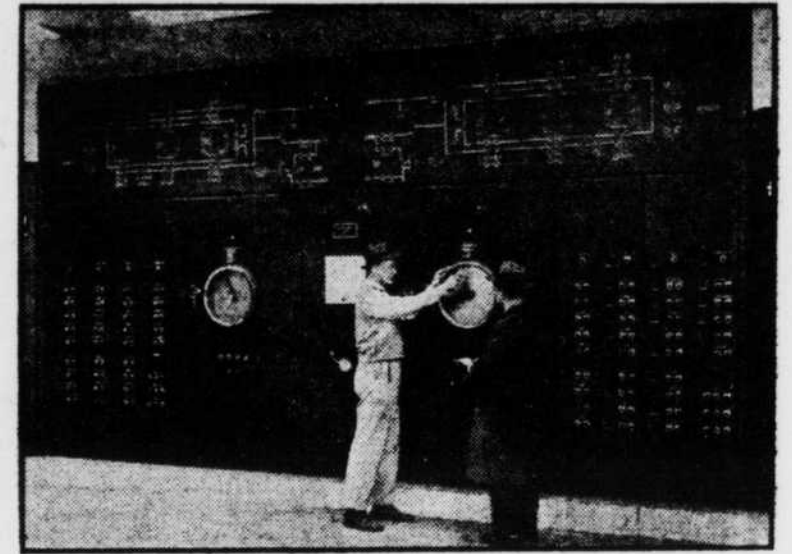
The plant now being erected on the old site will utilize what is known as the Houdry process. In this, the oil vapor is fed into thousands of tubes, totaling miles in length, that fill the big cases. They have their molecules cracked apart in the presence of great quantities of chalky-looking pellets of one of those inanimate chemical magicians known as catalysts. Cooled off, some of them condense as liquids, to be blended into the tailor-made mixture of volatile liquids that is a modern airplane's fuel. Other parts have to be run through the hot ordeal again, until the cracking job has been done exactly right.

The process is intense; it can go on for just 10 minutes before the catalyst pellets are so coated with carbon—actually gas coke—that they are inactive. Five minutes are allowed to suck the vapors out. Then for 10 minutes the carbon is burned off, generating terrific heat. Five minutes more are allowed to draw off these incandescent products of combustion.

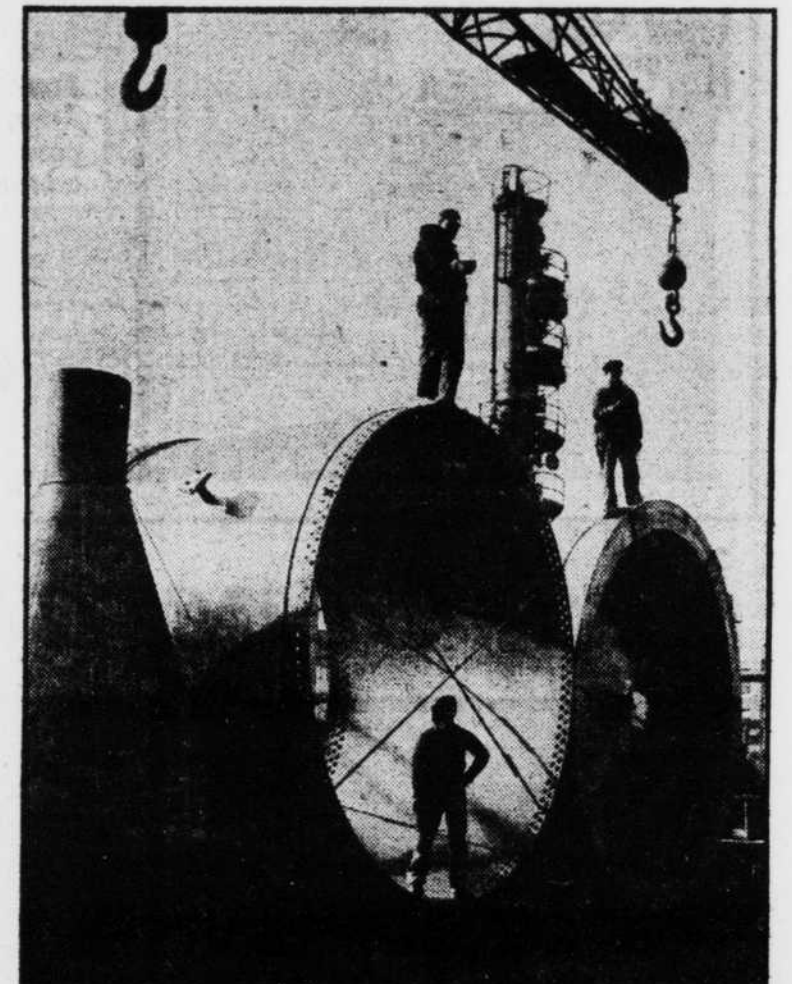
These fiery gases are not wasted. They are run through a couple of big gas turbines, where much of the power used in the plant is generated. More of the heat energy is saved when a melted chemical salt is run through the cases, as water is run through the cooling system of an automobile. It flows through steam boilers instead of actual fire. At a working temperature of 800 degrees, steam is generated at pressures comparable to those worked up in the power plants of present-day warships. Finally, gases that are of no use in synthesizing gasoline are used as fuel in a battery of multi-cylinder internal-combustion engines.

Waste heat is the "squeal" of a power plant. Here, the last squeak of the squeal is utilized.

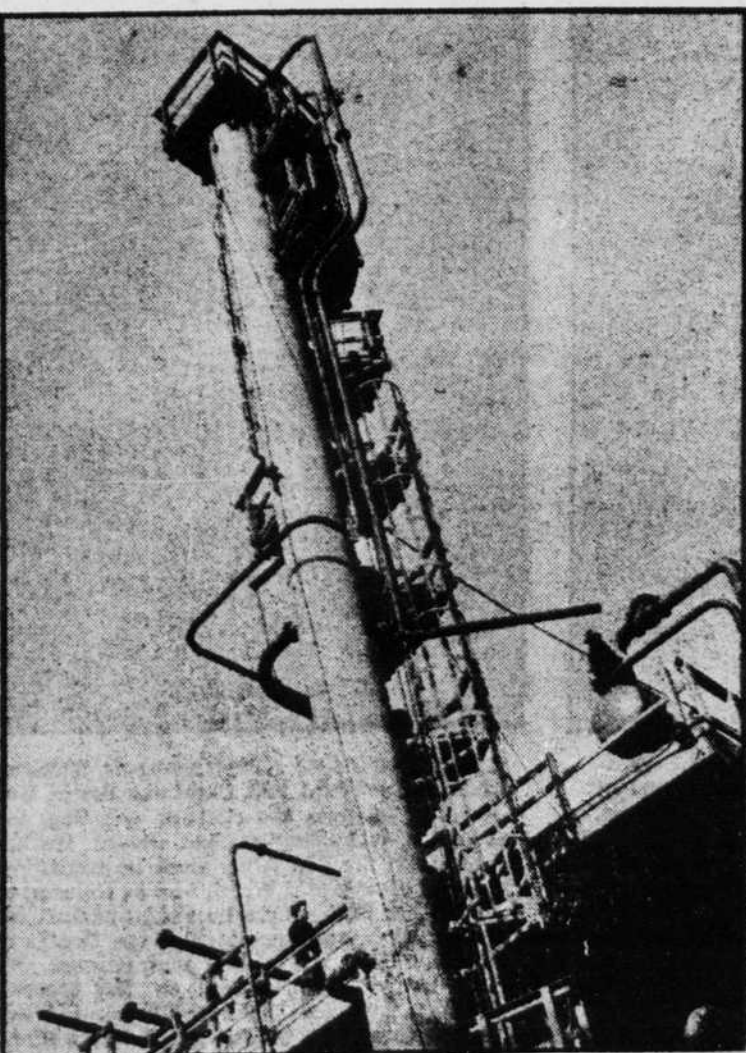
But if the ghost of old John D. could come back as the ghost of young John D., with his proudly-inscribed million-dollar articles of incorporation in his pocket, duly sealed and signed on Jan. 10, 1870—wouldn't he blink and wonder what on earth it was all about?



CONTROL boards look simple, but they guide complex operations in producing 100-octane.



TAR separator arrives at site of new 100-octane gasoline refinery in 14-foot sections

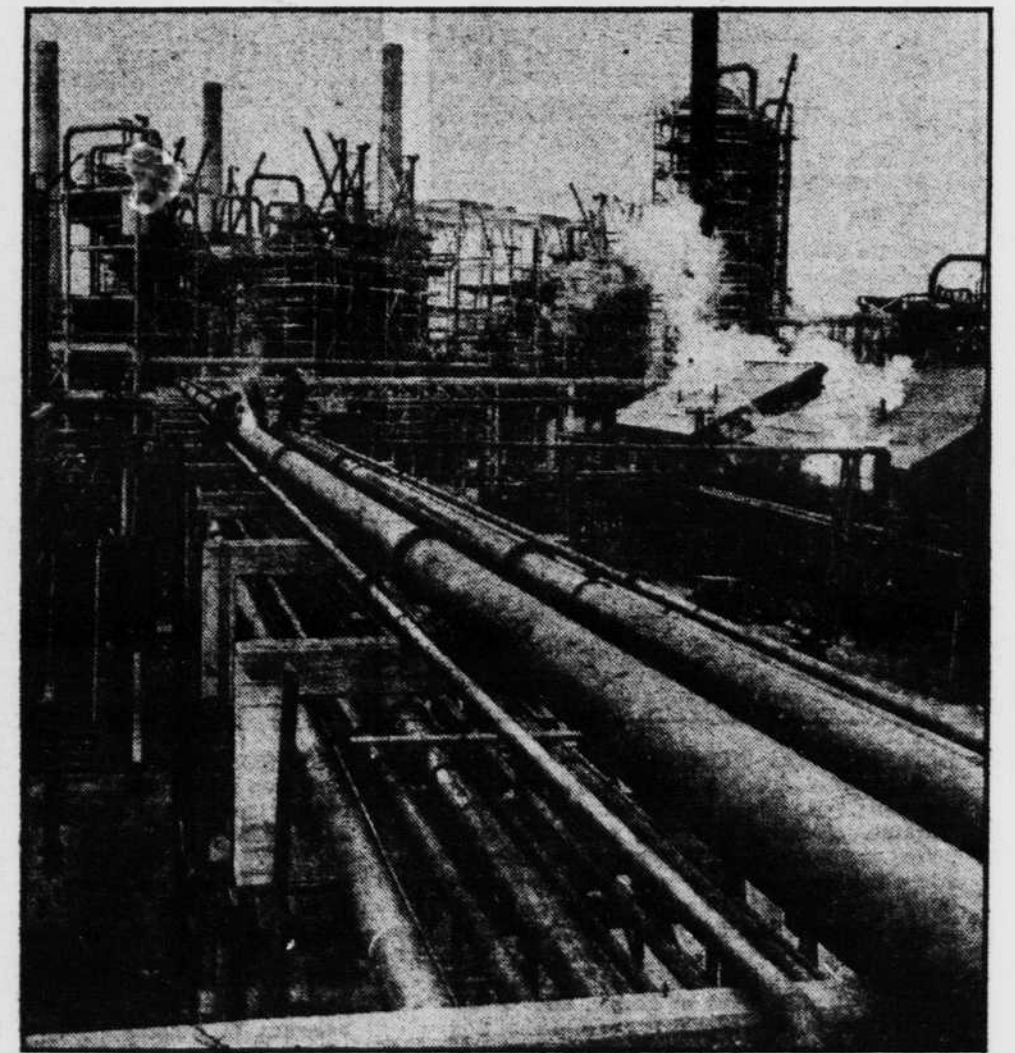


COMPARE size of this huge gas absorber tower with the men who are rushing its construction.



NEW refinery is on the site where John D. Rockefeller built this early Standard Oil plant about 75 years ago.

(Every Week Magazine and Science Service—Printed in U. S. A.)



IMMENSITY of the new 100-octane aviation gasoline plant is indicated by this view of the nearly finished refinery.