

METALLURGY

# New Process Economically Recovers Zinc From Ores

Development of U. S. Bureau of Mines Is First Notable Change Since Chinese Smelted Metal in 600 A. D.

A SIMPLER, cheaper method of smelting zinc from the concentrated ore in purer form than it has been recovered in the past by smelting methods has been devised by Charles G. Maier, metallurgist at the Pacific Experiment Station of the U. S. Bureau of Mines in Berkeley, Calif. The new method is said to be the most important change in the smelting of zinc since the metal was first smelted by the Chinese in 600 A. D.

## Described Before Engineers

Mr. Maier's process was described before executives and engineers of the zinc industry at the meeting of the American Zinc Institute by R. S. Dean, chief engineer of the metallurgical division of the Bureau of Mines. While it is not expected that the process will immediately revolutionize the industry, it will doubtless be adopted by many plants as rapidly as old equipment can be economically discarded.

The development is welcomed as a partial solution at least to the problems of concerns that solely mine and smelt zinc. The present low price of zinc, it is said, is caused by the dumping of zinc on the market by mines of which zinc is only a by-product. If zinc miners can produce a purer product cheaper than they are doing now, their troubles will be considerably lessened. Officials of the Bureau of Mines say that it is impossible to state quantitatively what savings the new method will effect.

By present processes zinc oxide concentrated by mechanical means from the ore is heated in clay retorts with coke until the coke unites with the oxygen of the oxide to form carbon monoxide and carbon dioxide, leaving metallic zinc. The coke has to be shipped to the zinc mines from great distances.

The new method employs natural gas, which is abundant near many zinc mines. Natural gas, known to chemists as methane and composed of one carbon atom to four of hydrogen, is passed over the zinc concentrate at a lower temperature than that used in the old retorts.

All the products of the resulting reaction are gases: the zinc vaporizes and condenses in almost as pure form as that now obtained electrolytically; the oxygen of the oxide joins the carbon to form carbon monoxide, while the hydrogen passes off as the free gas.

An abundance of these by-product gases is generated and used to pretreat the concentrate and heat the retorts. The temperature of the chief reaction is so low that a metal instead of a clay retort can be used. Additional economy is also achieved by the fact that the process is continuous whereas the old method is intermittent.

## From Theory to Practice

The working out of the new method is a striking illustration of the application of fundamental research to engineering problems. For some time engineers had been seeking with cut-and-try methods a new process of smelting zinc, but had had no success. Mr. Maier, a physical chemist, studied the reactions involved in converting zinc ore into the pure metal and became convinced that those looking for a new

process were not working in the right direction.

He then worked out theoretically the chemical equations for what he thought would be the right process. These reactions were next checked in the laboratory and found to take place as predicted. The final step was the building, during the past year, of an experimental plant at the Rare and Precious Metals Experimental Station of the Bureau of Mines at Reno, Nevada, where the process was actually tried out.

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AVIATION

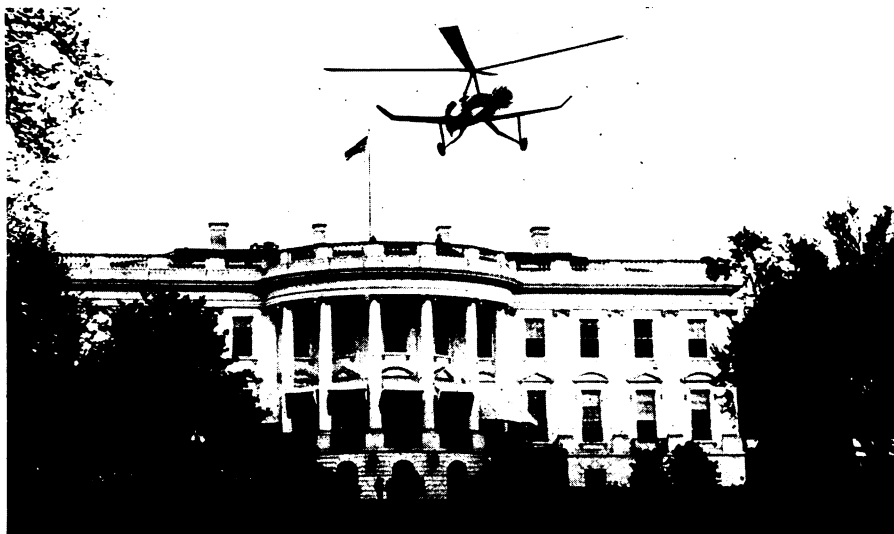
## Improvements to Autogyro Make Craft More Useful

GREATLY improved over predecessor models of just three years ago, the 1931 autogyro can more nearly duplicate the performance of ordinary airplanes and at the same time maintain its ability to take off at an extremely sharp angle and descend almost vertically and slower than a falling parachute.

Perhaps the greatest improvement that has been made in this country since H. F. Pitcairn brought the first autogyro to America in 1928 is the speeding up of the rotors by a clutch connection with the motor. The present models are able to travel 125 miles per hour in contrast with the 70-mile-per-hour speed of three years ago.

Cabin autogyros are being developed in England, while France is experimenting with seaplanes of the new type.

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*Wide World*

**DEMONSTRATING IMPROVEMENTS ON THE WHITE HOUSE LAWN**  
An autogyro plane taking off easily from the tree-confined grounds behind the White House after its pilot had received the Collier Trophy for the outstanding development in aviation during 1930.