

PHYSICS—METALLURGY

New Metal Working Machine Is Also Powerful Testing Device

Huge Machine for Aluminum Plant Capable of Exerting 3,000,000 Pounds in Compression and 1,000,000 Tension

See Front Cover

THE WORLD'S most powerful testing machine, capable of exerting a force of 3,000,000 pounds in compression and 1,000,000 pounds in tension at speeds as high as 36 inches per minute, recently commenced operations at New Kensington, Pa., in the research laboratories of the Aluminum Company of America.

Due to the boom in the aircraft industry, consumption of aluminum has increased, the 1939 output being the largest on record, 327,090,000 pounds valued at \$64,600,000. Even greater production is predicted for this year. Installation of new production equipment is being rushed, and stocks of standard aircraft products are being accumulated. Notable new equipment includes a large hammer, weight 1,000,000 pounds for forg-

ing propellers, crankshafts and landing gears. A large corrugating press for the manufacture of airplane wings and other aluminum products will shortly be in service.

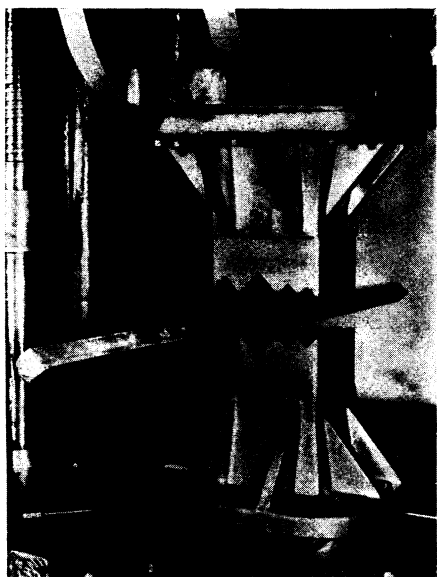
The enormous machine, standing three stories high, can flatten a locomotive boiler as easily as a five-ton truck would crush a tin can on the street; but what interested the experts most was its delicacy of operation. It can crack the crystal on a watch without damaging the works.

While not the largest machine of its kind in the world—the National Bureau of Standards in Washington has a device that can push with a force of 10,000,000 pounds—the new unit is claimed to be the most powerful. The government unit can squeeze at a speed of only a half-inch per minute, while the New Kensington unit can squeeze 36 inches per minute, and power is defined as force times the speed at which it is exerted.

The New Kensington unit is much more than a mere testing machine. With all manner of accessory parts and a myriad of instruments it is also adapted for actual plant production of aluminum alloy forging with a maximum of knowledge about the pressure conditions at the instant of forging.

The huge piece of equipment is called the Templin machine, after R. L. Templin, chief engineer of tests for the Aluminum Company. The Baldwin-Southwark Corporation of Philadelphia built the device.

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POWERFUL

These jaws of the Templin precision metal working machine are here shown press forging an aluminum ingot. Although this machine can exert pressures up to 3,000,000 pounds, it is so sensitive that it can break a watch crystal without damage to the watch works or crack an egg without spilling the contents.

ARCHAEOLOGY

Gears for Colonial Mill Found in South Carolina

A SET of wooden mill gears, buried for over 200 years and perhaps as long as 300 years, have recently been discovered in South Carolina, according to Prof. B. W. Dedrick, retired milling expert of Pennsylvania State College who has been tracing the antiquity of the

relics. The mill gears may turn out to be one of the oldest pieces of industrial machinery in America, and possibly also a clue to the famed "lost" colony of settlers at Roanoke, N. C.

Found by W. L. Glover, an Orangeburg, S. C., banker, when he dug on the site of a dried up mill pond some 30 miles from that city, the gears were apparently parts of separate mill wheels, the largest 19 feet in circumference.

Prof. Dedrick, an authority on old-time mills, cites as evidence for the antiquity of the wooden gears the complete lack of any neighborhood recollections—extending back more than 100 years—that a mill ever existed on the South Carolina site. Mills, in colonial days, were important landmarks and anecdotes or recollections about them are carried on for generations. Absence of such anecdotes are a mark of extreme antiquity. Also found in the dried-up mill pond is a magnolia tree, bearing the date 1782, which presumably would not have taken root until after the mill pond became dry.

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PHYSICS

Photos Show Disintegration Of Mesotron Into Electrons

FIRST photographic evidence that the heavy weight kind of electrons—the mesons or mesotrons—disintegrate into ordinary electrons has been obtained in Wilson cloud chamber studies made by Drs. E. J. Williams and G. E. Roberts of the University College of Wales (*Nature*, Jan. 20).

The picture supports predictions made back in 1935 by the young Japanese physicist Yukawa and never before substantiated; that there would be mesotron particles and that they would disintegrate into electrons. Some years later mesotrons were found, but until now the transformation into electrons has not been discovered.

Only a single picture, out of many thousands taken, has been obtained showing the historic mesotron-electron transformation. Perhaps the picture is a freak and due to happenstance, but scientists are strongly inclined to believe that it supports the mesotron theories of Yukawa.

The picture shows the cloud chamber track of a mesotron particle going through the chamber. Near its end it abruptly turns off at a sharp angle and the new track is thinly ionized in a manner characteristic of a positive electron.

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