MATHEMATICS

Adds in 1/5000 of a Second

General purpose electronic computing machine expected to solve problems of nuclear physics, aerodynamics and scientific weather prediction.

See Front Cover

➤ THE FIRST all-electronic general purpose computer ever developed made its debut at the University of Pennsylvania recently. Capable of adding numbers in 1/5000 of a second, it will help free scientists from time-consuming routine calculations. The machine is shown on the front cover of this SCIENCE NEWS LETTER being prepared to solve a problem in hydrodynamics.

Originally developed to compute lengthy and complicated firing and bombing tables for vital ordnance equipment, the machine is expected to solve equally complex peacetime problems such as those of nuclear physics, aerodynamics and scientific weather prediction. It is capable of carrying out computations 1,000 times faster than the most advanced general-purpose calculating machine previously built.

The most intricate and complex electronic device in the world, the Electronic Numerical Integrator and Computer was built at the Moore School of Electrical Engineering of the University of Pennsylvania for the Army Ordnance Ballistic Research Laboratory at Aberdeen. It contains about 18,000 electronic tubes. Some idea of the machine's complexity can be gained by comparing it with an average home radio set, which has ten tubes. The largest radar set uses 400 tubes, and the B-29 bomber has less than 800 tubes.

The heat generated by the multitude of vacuum tubes is dissipated by a temporary blower system. The noise from such a system will be eliminated, however, when the ENIAC is installed in its specially designed air-conditioned building at its permanent location at Aberdeen Proving Ground. The building is expected to be completed some time this summer.

Two comparatively small machines are used with the ENIAC. One feeds information into the ENIAC from punched cards and the other receives the results from it in a similar manner.

Special equipment allows the circuits to be easily tested. A test bench with its own power supply and electronic oscillographic equipment has been set up so that individual units may be withdrawn and tested without interfering with the operation of the machine.

The ENIAC is estimated to have cost around $400,000. This includes all research and development work involved as well as cost of the equipment. Future machines of this type can be produced much more cheaply. This super computing machine was begun in July, 1943, and finished in the fall of 1945.

The original idea for the electronic general purpose calculator came from Dr. John W. Mauchly of the Moore School faculty. Dr. Mauchly, previously faced with many physical and meteorological problems requiring voluminous calculation, conceived of electronic devices for handling large computing problems in a mass-production manner. J. Presper Eckert, Jr., a recent graduate of the Moore School, joined Dr. Mauchly in elaborating the plans for the ENIAC and took charge of the technical and engineering work.

Capt. Herman Goldstine, mathematician and ballistics expert for Army Ordnance, saw in Dr. Mauchly's plans a powerful tool needed by the Ballistic Research Laboratory for handling its overwhelming computational work and enthusiastically promoted the interest of the Ordnance Department in undertaking its development.

Col. Paul N. Gillon, at that time assistant chief of the research division of the office of the chief of ordnance, enthusiastically sponsored the ENIAC.

Science News Letter, February 23, 1946

PHYSICS

Reflectoscope Detects Flaws in Solid Objects

➤ A SUPERSONIC reflectoscope using sound waves to locate flaws in solid objects has been developed at the University of Michigan and is being produced commercially, reports Dr. Floyd A. Firestone of the departments of physics and engineering research of the University.

Using a quartz crystal covered with a film of oil to contact the object being tested, the reflectoscope radiates sound waves into the material being tested. The radiated waves reflect back to the instrument and are magnified on an oscilloscope screen. Flaws are detected by variations in the visible oscillations on the screen.

The supersonic reflectoscope sends sound waves into the object being tested for periods as short as a millionth of a second. This produces only a few short-length waves that may be easily read on the screen, and it permits the tester to quickly note flaws in materials being examined.

In addition to testing the structure of solids such as iron, steel or aluminum, Dr. Firestone says the supersonic reflectoscope may be used to determine the level of liquids inside tanks.

Science News Letter, February 23, 1946

AGRICULTURE-CHEMISTRY

Large Scale Production Of Sweet-Potato Starch

➤ LARGE-SCALE commercial production of sweet-potato starch will start in Clewiston, Fla., next fall, in the newly completed $7,000,000 plant erected by the United States Sugar Corporation. Annual output of starch is expected to be 75,000,000 pounds; a valuable by-product will be 30,000,000 pounds of stock feed from the spent root pulp.

The starch and its derivatives can be used in a wide range of commercial applications, including food products, adhesives, laundry starch, paper and textile sizings, and even explosives.

More than 12,000 acres of rich Everglades soil will be plowed and planted to sweet potatoes. Not all the acreage is owned by the company; part of the crop will be raised under contract by local farmers on their own land. A new sweet-potato variety, bred for this special purpose, has a considerably higher starch content than ordinary table varieties. Individual roots get to be as big as a man's head, and total yield per acre runs from 500 to 700 bushels.

Full operation had been scheduled to begin in 1945, but a hurricane ruined so much of the crop that some delay in starting was unavoidable.

Science News Letter, February 23, 1946

Canned food 93 years old was found in 1944 on Dealey island in the Arctic north of Canada where it had been placed in a cache by a British ship in 1852; laboratory tests showed some of the food in good condition.