

ENGINEERING—MATHEMATICS

Giant New Calculator

This automatic sequence controlled mathematical robot will save many man-hours and solve problems heretofore too intricate for solution.

► A GIGANTIC mathematical robot, described as "the world's greatest calculating machine," is going into the war service of the U. S. Navy at Harvard University after its presentation to Harvard by the International Business Machines Corporation.

Completely new in principle and unlike any calculator previously built, this 51 by 8 foot calculator is the result of two years of basic theory research by its inventor, Commander Howard H. Aiken, U.S.N.R. and six more years of design, construction and testing at the IBM engineering laboratory at Endicott, N. Y.

This automatic sequence controlled calculator, as it is called, was accepted at ceremonies by President James B. Conant of Harvard as a gift from President Thomas J. Watson of IBM.

For the present this new algebraic superbrain will be devoted to war problems, but when the Navy no longer needs it it will explore vast fields in pure and applied mathematics and other sciences and produce answers to problems so intricate and time-consuming that they have only very tedious solutions.

The machine can add or subtract in a third of a second, and the elementary operation of determining sine x , an operation unique to this machine, takes only 88 seconds, for example.

One typical problem was solved by this machine in 19 hours, whereas it took four expert girls three weeks to do the same work, using ordinary office calculators.

A steel frame 51 feet long and 8 feet high holds the calculator, which consists of an interlocking panel of small gears, counters, switches and control circuits, all only a few inches in depth. Five hundred miles of wire with 3,000,000 connections, 3,500 multipole relays with 35,000 contacts, 2,225 counters, 1,464 tenpole switches, and tiers of 72 adding machines, each with 23 significant numbers, are used in the machine.

One of the problems scheduled for the machine when it returns to civilian use is the solution of the dynamic equations of the solar system, never solved

because of their intricacy and the enormous time and manpower required. Atomic physics, radio research, investigations of the ionosphere, actuarial work, optics, and electronics will also benefit immensely. Many mathematics functions defined by infinite series or infinite processes, useful in physics, chemistry, engineering and pure mathematics, await tabulation.

Commander Aiken, now on leave as associate professor of applied mathematics in the Harvard Graduate School of Engineering, was assisted by Robert V. D. Campbell, now Ensign Campbell, U.S.N.R., during the latter years of the construction of the machine. Clair D. Lake of IBM directed the machine's construction jointly with Commander Aiken and they were assisted in design by Frank E. Hamilton and Benjamin M. Durfee of IBM.

The intricate mechanism is controlled by paper tape into which are punched the data to be handled. One feature of the operation is that there can be built up a library of these tapes that can be used in connection with future problems.

Science News Letter, August 12, 1944

● Books Off the Press ●

- THE BUSINESS OF GETTING WELL—Marshall Sprague—*Crowell*, 143 p., \$1.75.
- BY SEA AND BY LAND—Earl Burton—*Whittlesey*, 218 p., illus., \$2.75.
- CASE STUDIES IN THE PSYCHOPATHOLOGY OF CRIME—Benjamin Karpman—*Medical Science Press*, Vol. 2, \$16. Independent of Vol. 1. New cases, new research.
- CHECKLIST OF THE COLEOPTEROUS INSECTS OF MEXICO, CENTRAL AMERICA, THE WEST INDIES, AND SOUTH AMERICA—R. E. Blackwelder, Comp.—*Govt. Printing Office*, 341 p., paper, 30 cents. Smithsonian Inst., Bulletin 185.
- CHINA—A. G. Wenley and John A. Pope—*Smithsonian Inst.*, 85 p., paper, illus., 25c. War Background Studies, No. 20.
- ELECTRICAL TECHNOLOGY AND THE PUBLIC INTEREST: A Study of Our National Policy Toward the Development and Application of Inventions—Frank J. Kotke—*Am. Council on Public Affairs*, 199 p., paper, \$2.50.
- ENJOY YOUR HOUSE PLANTS—Dorothy H. Jenkins and Helen Van Pelt Wilson—*Barrows*, 238 p., illus., \$2.50.
- FOREIGN MAPS—Everett C. Olson and

Agnes Whitmarsh—*Harper*, 237 p., \$4. Harper's Geoscience Series.

A GUIDE TO NAVAL STRATEGY—Bernard Brodie—*Princeton Univ. Press*, 314 p., \$2.75.

HOW TO SOLVE PROBLEMS IN PHYSICAL CHEMISTRY—Joseph A. Babor and Garrett W. Thiessen—*Crowell*, 214 p., paper, illus., \$1.25.

INTRODUCTION TO QUANTITATIVE ANALYSIS—Saul B. Arenson and George Rieveschl, Jr.—*Crowell*, 386 p., illus., \$2.75.

MERCHANT SHIPS 1943: Founded, Compiled, Drawn and Edited—E. C. Talbot-Booth and E. B. R. Sargent—*Macmillan*, illus., \$19.

MODERN WOOD ADHESIVES—Thomas D. Perry—*Pitman*, 208 p., illus., \$3.

PACKAGING CATALOG, 1944—*Packaging Catalog Corp.*, 766 p., illus., \$2.50.

PRACTICAL PSYCHOLOGY—F. K. Berrien—*Macmillan*, 584 p., illus., \$4.

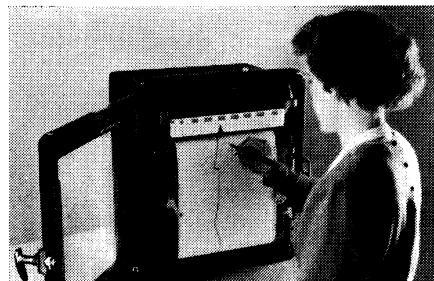
SEWING FOR THE BABY—*Barrows*, 293 p., illus., \$1.98.

SPEED IN ANIMALS: Their Specialization for Running and Leaping—A. Brazier Howell—*Univ. of Chicago Press*, 270 p., illus., \$4.

WOOD CHEMISTRY—Louis E. Wise, ed.—*Reinhold*—900 p., illus., \$11.50. Price Correction.

YOU ARE YOUNGER THAN YOU THINK—Martin Gumpert—*Duell*, 244 p., \$2.75.

Science News Letter, August 12, 1944



MICROMAX

—A DEPENDABLE LAB WORKER

"I could use this Recorder on the data of various phenomena during my astronomical expeditions to Penang . . . Jamaica . . . Greenland," wrote one Professor after reading a description of the Micromax Recorder.

"Measuring and recording solution potentials of zinc and aluminum," is one use to which Aluminum Company research men put Micromax Recorders.

North Carolina State College uses Micromax to control A.S.T.M.-test furnaces; at Ohio State U. they record sunlight, dryer temperatures, pH, critical points of metals; are also useful in voltage, frequency, gas-analysis, etc.

A Micromax Recorder is a motor-driven, null-balance instrument—an outstanding value for both scientific and industrial work.

When inquiring about Micromax, be specific, so we may send a specific recommendation.

LEEDS & NORTHROP
MEASURING INSTRUMENTS • TELEMETERS • AUTOMATIC CONTROLS • HEAT-TREATING FURNACES
Jr. Ad. ND (4C)