'BRAIN' SPEEDED UP FOR WAR PROBLEMS

Electronic Computer Will Aid in Clearing Large Backlog in Weapon Research

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ABERDEEN, Md., Dec. 12 — Eniac, the only electronic computer among the four "mathematical brains" now in use, is being converted so that it can handle without resetting all types of mathematical problems to which it is adapted, it was disclosed at the Aberdeen Proving Ground today.

Seventeen per cent of the machine time is now lost in changing the set-up by resetting switches and pulling plugs every time the type of problem fed into the robot is changed, Dr. Franz L. Alt of the Ballistic Research Laboratories reported. The loss is higher as the variety of problems is increased.

Col. Leslie E. Simon, director of the laboratories, said the latest change-over was begun five months ago, on the basis of a new mathematical approach by Dr. John Von Neumann of the Institute for Advanced Study, Princeton, N. J., and was scheduled to be completed by Christmas. It involves adding a panel of circuits and making other minor structural changes in the machine. These retain the basic design and permit the machine to be reconverted at any time to the former set-up, which gives faster results in computing firing tables and other ballistic work used in wartime research.

Better Machine on Way

The reconversion will give the Eniac a substantial part of the efficiency which is being built into the Edvac, a more advanced type of automatic computer, employing both electronic and electrical relay circuits. Edvac will not be completed for at least seven months, Colonel Simon said.

Greater efficiency was needed in electronic computing and this could not wait on the completion of Edvac because there was a backlog of six months of top-priority computation in basic research for pilotless aircraft, guided missiles and supersonic flight, the colonel explained. Eniac is a year or more behind on important but less urgent business, he said.

Dr. Alt said the top-priority work scheduled for Eniac for the next six months could be done by human computers only in 250,000-man hours.

As an illustration of the type of work being done on Eniac, Colonel Simon cited the measurement of the path of the V-2 rockets which are being fired at the White Sands proving range in New Mexico. Nine methods of measurement are employed, including advanced-instrument techniques such as radio and radar, to track the missiles every 2.6 feet they move. Plotting the path requires solving for 900 points and it cannot be done by human computation in time to be of any value. Eniac does the job in seven minutes.

"Orders" to Robot Reduced

Dr. Von Neumann explained that the problem of the conversion involved finding a set-up of the robot's two sets of twenty accumulator tubes which would work for all types of problems.

By an approach through mathematical logic it was found, he said, that the robot could be taught, in effect, a simplified dictionary instead of directing its operation by 350 to 380 orders having a highly complex inter-relationship. It was found that the orders could be reduced to sixty to seventy. That could be put on punch cards and checked by a machine developed by the International Business Machines Corporation. This approach requires the mathematician to translate his problem into sixty orders.

One advantage, Dr. Von Neumann said, is that the new system of operation more nearly approximates the operation of the human brain in mathematical thinking and avoids errors in preparing problems for the machine. It requires more human brains in the form of mathematicians, however, for the preparatory work. Although the machine is still operated by magnetic tape, the problem is fed into the machine from punch cards and the solution is printed on punch cards.

The new coding technique is being demonstrated to 300 members of the Eastern Association for Computing Machines who are attending a meeting that closes tomorrow morning.