

[Excerpts from article in *New York Times*, 31 May 1949, part 9, p.1, col. 2]

## **“Electric Brain able to translate foreign languages is built”**

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Los Angeles, May 30 - A new type of “electric brain” calculating machine capable not only of performing complex mathematical problems but even of translating foreign languages, is under construction here at the United States Bureau of Standards Laboratory at the University of California’s Institute of Numerical Analysis. While the exact scope of the machine will have in the translating field has not been decided, the scientists working on it say it would be quite possible to make it encompass the 60,000 words of the Webster Collegiate Dictionary with equivalents for each word in as many as three foreign languages.

The machine tentatively dubbed the “zephyr” is, like its predecessors, just a staggering elaboration of the ordinary desk calculating machine. On the latter, numbers are cogged on wheels, or equally elementary methods; in “electric brains” the numbers are registered in terms of electrical impulses enormously increasing the machine's capacities and speed.

... [etc. on computers, ENIAC, EDVAC, UNIAC, etc.]

...it is in this drum that the machine’s vocabulary can be stored, words being converted into the same sort of electrical symbols by which the machine assimilates numbers for calculation.

When a foreign word for translation is fed into the machine, in the form of an electro-mathematical symbol or a tape or card, the machine will run through its “memory” and if it finds that symbol as record, will automatically emit a predetermined equivalent - the English word.

This admittedly will amount to a crude word-for-word translation, lacking syntax, but will nevertheless be extremely valuable, the designers say, for such purposes as scientists’ translations of foreign technical papers in which vocabulary is far more of a problem than syntax. An obvious corollary is its possible use in cryptography.

The work is being directed by Dr. Harry D. Huskey of the Bureau of Standards, and his wife, Dr. V.R. Huskey, who both participated in the development of the ENIAC machine.

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[editorial in *New York Times*, 1 June 1949, p.30, col.3]

## **“Translating by machine”**

It has often been said that mathematics is a language. This being so, those wonderful electronic calculators that multiply two 14-digit numbers together to give a 28-digit answer in a fiftieth of a second and handle a dozen simultaneous equations in a minute are ingenious chatterers. Mathematicians will not be astonished to learn that out in California the Bureau of Standards is building a machine that will actually translate words from three foreign languages.

We have our misgivings about the accuracy of every translation. How is the machine to decide if the French word “pont” is to be translated as “bridge” or “deck” or to know that “operation” in German means a surgical operation? All the machine can do is to simplify the task of looking up words in a dictionary and setting down their English equivalents on a tape, so that the translator still has to frame the proper sentences and give the words their contextual meaning. No doubt the thousands of words to be translated will appear as holes punched in cards. The cards will be “read”, whereupon translations of selected words will appear on a tape. Whether the holes in the cards represent mathematical symbols or words is of no moment to the machine's designer. We are still far from the machine into which we will pour cards and pull out great poetry or great novels. In fact we shall never reach that stage. One mathematician is said to have remarked "the more you work with these calculators the more stupid they seem", meaning of course, that somebody has to state the problem to be solved in the first place.

Nevertheless, electronic automata do have what looks like limited judgment and what may be called “memories”. They know when mistakes have been made in stating a problem and get excited about them. They also have their tantrums - their pathology. In fact they behave in so human a way in Prof. Norbert Wiener’s opinion they will clarify some of the functions of the nervous system. His brain makes man what he is, yet the brain is not the whole man. At a conference held last April at Harvard Prof. N. Rashevsky told of differential equations that predict what geometrical figures in a set people will like and dislike. Such differential equations can be handled by machinery. So can thousands of biological facts - facts that it would take years, even a lifetime, to compile and interpret. Translating 5,000 technical words from French into English – what’s that compared with the making of discoveries that will tell us what happens in the nervous system when we are worried or angry or when a normal cell in the body goes wild and grows into a tumor?