LINGUISTICS

Automatic Dictionary

➤ A 600,000-WORD DICTIONARY to be used by a computer in a program of linguistic research has been developed at the University of California at Berkeley. No human hand will flip through this dictionary as the program was designed to result in the automatic translation of Russian technical literature solely by means of electronic equipment.

According to Dr. Sydney M. Lamb, lecturer in linguistics in charge of the program, the new Russian-English dictionary has the largest vocabulary in the machine translation field. The California system has as its ultimate goal the translation of 360,000 words per hour at a fraction of the cost of human translations.

The mechanical dictionary, called RUSDIC, will be used in conjunction with a program on the University's IBM 704 computer which looks up the words needed for specific translations.

Dr. Lamb explained that all dictionaries for human use have entries consisting of a heading and a definition following immediately after. But in the RUSDIC the definitions are completely separated from the headings. When the 704 looks up a word in the mechanical dictionary, a reference number associated with the heading tells the computer where to find information on the word. The location of the word in the dictionary reveals to the machine the "address" of the information about that word.

When the 704 arrives at the new address, it finds three types of information on the word in question: a code giving syntactic and semantic information on the word, rules for dealing with the word in context, and the addresses of equivalent words in English.

One of the beauties of the computer programs for look-up and dictionary arrangement, according to the linguist, is that they may be used with a similar mechanical dictionary for any language. The overall machine translation system being developed by Dr. Lamb and his associates will produce intelligible English sentences out of any language for which a mechanical dictionary exists.
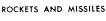
The system, when completed, will be as fast as the computer with which it is used. For example, dictionary look-up operates at a rate of about 125 words per second on the 704. But on the faster IBM 7090, it would do about 500 words per second. At this rate it would take about one minute and 20 seconds to look up all the words in the average Russian technical journal.

For the complete machine translation system the 704 would do about 70,000 words per hour, assuming that a very good quality translation was desired. On the 7090, Dr. Lamb expects to translate about 360,000 words per hour, or a journal every nine minutes.

The linguist, whose work is supported by the National Science Foundation, will soon expand his project into the machine translation of Chinese technical literature.

A fully operating machine translation system, he said, still lies several years in the future. When it comes it should cost about one-eighth of a cent per word if used on the IBM 7090. A slight additional cost will also be necessary for recording the printed word on magnetic tape for use by the computer. Present costs of human translation range from one to three cents per word.

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DIPOLES, NOT SCRATCHES—The tiny metallic fibers, or dipoles, about a half inch long and one-third the diameter of a human hair, will be placed in orbit to relay radio messages over very long distances, in a new "orbital scatter" communication system developed by the M.I.T. Lincoln Laboratory, Lexington, Mass.

GENERAL SCIENCE

National Science Fair— International Expanding

➤ THE SCOPE of the National Science Fair—International is widening steadily with the affiliation of additional area and state fairs, cooperation from still more professional organizations and expansion of the activities of agencies already supporting this international program to encourage the development of potential scientists, engineers and technologists.

With 1960-61 science fair activities just beginning, affiliation forms have been received from seven new fairs, according to SCIENCE SERVICE which conducts the national fair as part of its science youth program. A number of other fairs here and abroad expect to complete affiliation plans in time to be part of the 12th National Science Fair-International when it is held next May in Kansas City, Mo.

The American Heart Association and the Optical Society of America will make awards at the annual event and are planning cooperation with regional and area science fairs through their local chapters.

The U. S. Army and the Association of the U. S. Army will increase the number of awards made at the national level and the support offered local and regional fairs by area commands. The U. S. Air Force also is enlarging its award program at both the national and regional levels.

New fairs whose affiliation has been completed include: Western Colorado Science Fair, Mesa, Colo.; Northeastern Indiana Tri-State Science Fair, Angola, Ind.; Rockland County Science Fair, Nyack, N. Y.; Texas District III Regional Science Fair—Southern Division, Harlingen, Texas; Wiley College Science Fair, Marshall, Texas; Vermont State Science Fair; Knights of Pythias First Fox Valley Science Fair, Appleton, Wis.

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ROCKETS AND MISSILES

Satellite System in 1963

➤ THE DEPARTMENT OF DEFENSE will have an operational communications system using a satellite or satellites by early 1963, a technical director in the Army's Office of the Chief Signal Officer, told a space electronics and telemetry symposium meeting in Washington, D. C.

Clifford D. May Jr. said the system would be improved over the experimental Courier communication satellite soon to be launched. but even this experimental model could handle the Army's bulk communications traffic at 1963's expected level—if ground stations were available to send and receive messages.

Mr. May spoke at the Institute of Radio Engineers' Fifth Symposium on Space Electronics and Telemetry.

For the 1963 system, Mr. May projected a "hypothetical system" using four ground stations in Asmara in eastern Africa, and the Philippines, Puerto Rico and Hawaii.

"As gateways they will distribute Courier messages throughout their respective areas by conventional means and act as area collection points for bulk traffic destined for another area via the satellite," he said.
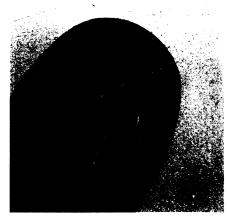
Courier would send down and receive messages for about six minutes over each station.

Special, high-speed teletypewriters would be used in the stations to gather and send information at a fast clip. Thus the satellite capacity could be upwards of 6,000,000 information bits per orbit between any two ground stations.

The satellite system would be tied into Unicom (Universal Integrated Communications System) now being developed by the Army. Eventually Courier satellites, which repeat messages as they swing about the earth, would be replaced by Advent satellites.

Advents will have 24-hour orbits and thus seem to stand still above the equator. Three or four could broadcast to each other and thereby to almost any part of the world.

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