FROM THE TOWER OF BABEL TO A TELECOM COUP

The debut of Janus, a powerful translation machine, heralds a new era

The caller is speaking Japanese. He finishes his sentence and seconds later a voice asks me in standard English about the timing of a European conference. A few minutes later, I place a call to Munich and tell a clerk I want to present a paper at the conference. After a moment, I hear my statement in German: *"Ich wurde gerne einen Arti- kel..."* What makes this telephone translation special is that computers, not people, are doing the work.

This magic comes courtesy of powerful new software called Janus, scheduled to make its international debut on Jan. 28. Janus is funded by some of the world's most powerful research giants, including Siemens, Nippon Telegraph & Telephone, and the Pentagon. It's the latest sign that the world's telephone and computer companies are racing to stake out chunks of the mammoth global translation market. Within a decade predicts Alexander Waibel, head of the Janus program at Pittsburgh's Carnegie Mellon University, telephone companies will be offering machine translation to international callers, and electronics companies will be selling handheld translators.

NICHE MARKETS. With world trade booming, the translation market is immense. Translation in Japan is an $8 billion industry, says Satoru Ikehara, group leader at NTT's Knowledge Systems Laboratory. Europe generates 100 million pages of translations a year. While companies keep one eye on cutting-edge efforts such as Janus, they're racing toward translation niches in the marketplace.

In Siemens' research center in Munich, 50 scientists are developing computer systems that read, listen, and talk. "This technology is our Sputnik," says Heinz Schwärtzel, head of system technology research at Siemens. The German company already has introduced a text translation computer, used mainly to turn computer texts from German into English. In a few years, Siemens expects to be marketing machines for telephone operators, hotels, and airports.

In Japan, 141 companies have teamed up with the Postal Ministry to pour $16 million into machine translation research. Fujitsu, Hitachi, Toshiba, Sharp, and NEC are all selling machines for translation of manuals, though the accuracy of the devices is low—only 70% for the easiest English-to-Japanese jobs. Sharp Corp. also has a print translation machine, Duet Qt, that boasts a 70,000-word vocabulary—bigger than Shakespeare's—and reads characters. But the package costs $50,000, prohibitive for individual consumers. Sharp plans to make only 1,000 of the machines a year.

unveiled the new system, called VEST, last summer. IBM, meanwhile, is developing automatic text-to-text translators for various languages.

NUANCES. The current machine translation binge is possible thanks to the growing speed of computer networks. The complex programs must hear a language, make sense of it, and translate it into a second language. The Carnegie Mellon Janus project takes this a step further by converting the original language into a base language called Interlingua. Using this computer Esperanto as a springboard, Janus can translate into several languages, not just one.

Until recently, all of these calculations could only be done on a supercomputer. But now researchers are able to accomplish much of the task on powerful workstations. At Carnegie Mellon, scientists are incorporating neural networks, which are the computer's closest approach yet to the hu-

Sophisticated translation programs that think like the human brain are still a long way off, but simpler devices are here already

The biggest hurdle facing the Japanese is to develop machines that can understand their spoken language. In 1991, NEC came up with a prototype of a multilanguage automatic speech-to-speech translator. But it has limited power. NTT's Ikehara calls it "a toy."

Most U.S. companies are content to leave the enigmas of Japan's language to the Japanese. Easier markets are closer to home. AT&T, together with Spain's Telefónica de España, has developed a Spanish-English speech-to-speech translator to handle bank transactions. They

man brain, into their Janus translation systems.

In time, researchers hope to teach the program to weigh nuances and learn from experience. But such sophistication is still far off. Computers, says Bill Hohenstein, president of Logos, a Boston machine translation company, only do well "when the writing is on the lines, not between the lines." If Janus lives up to its promise, that could change.

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