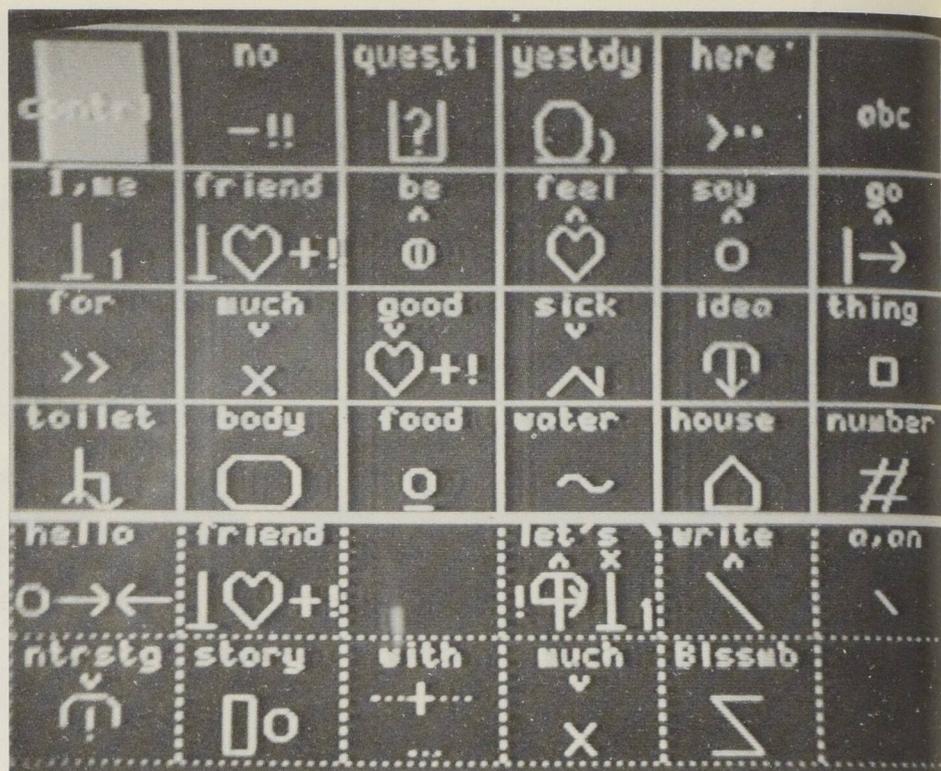


but a child with poor arm and hand control would use a light-sensitive input device. Thus, Susan was able to answer her teacher's question. The large number of symbols in the system – some 100 to 500 or more – creates the need for new devices to manipulate the symbols for communication. Under an NRC-Program for Industry/Laboratory Projects (PILP) contract (whereby contracts are negotiated with Canadian companies to carry forward the development of laboratory-initiated projects to an eventual marketable product) a microprocessor-based graphics generator is being developed by Norpak Ltd. of Pakenham, Ontario, which will display the Blissymbol messages on a conventional home television screen. This equipment will permit a child to build up a message at his own speed, selecting the symbols one at a time and displaying them in a normal left-to-right sequence on the TV screen where they are held for others to read. At school, a child could also "write" his answer to a question on a large TV monitor at the front of the classroom, or persons could send Blissymbol messages to each other over the telephone. The device will be a completely self-contained communication aid, accepting a variety of input interfaces – joysticks, push buttons, etc. An alphanumeric mode is also provided for those who have progressed to an alphabetic language. In this mode, a teletypewriter or similar device can be connected to give printed copy, turning the system into a typing aid. Alternatively, a synthetic speech module can be connected, giving audio reinforcement to the Blissymbols. A preproduction model has now been built and field trials are currently being carried out at three Canadian centres.

In order to explore his environment – to find out what makes things "tick" – a child must be able to move from one place to another. This stage in the child's development usually begins at about seven to nine months. But the child with a physical ailment – especially if it affects the spine – is severely restricted and often, unable to crawl around, spends this crucial phase of his life lying in his crib. The Caster Cart developed in collaboration with the Ontario Crippled Children's Centre of Toronto, and designed for children like Tommy, from nine months to two years, not only enables them to explore at floor level with their peers, but also provides them with the motivation to move from place to place and thus develop a measure of independence. At the same time, the child's hands are free for bilateral functional activities rather than being used for balancing. In addition, the Cart helps increase sitting balance and strengthens the upper limbs and trunk. It can be used either before a bracing device is fitted or in conjunction



Instead of employing alphabetic characters as in English or French, the symbolic language of Blissymbols makes use of a large number of graphic symbols, at times pictorially related to the concepts they represent. (Photo: DEE)

Au lieu d'employer des caractères alphabétiques, comme en anglais ou en français, le langage symbolique composé de symboles Bliss utilise un grand nombre de symboles graphiques, parfois pictographiques, des concepts qu'il représente. (Photo: DGE)

with one. Children can easily propel it with their hands by pushing on the large wheels, and it is directed into a turning position by the swivel caster. A detachable handle enables parents to wheel the child indoors, or outdoors to parks, shopping centres, etc. Donlee Plastics, manufacturers of plastic toys, designed the mold for the first pre-production units of the cart which were completed last summer (also under an NRC-PILP contract). Cost per unit is expected to be about \$75.

Over the years, a long line of devices have been developed for children and adults alike by a Council scientist (blind since childhood himself) to assist the blind in almost every area of daily living. Many can now be gainfully employed as computer programmers, at work in recording studios, photographic or electronics laboratories with the substitution of tactile or audible signals for visible "read out".

Children with learning disabilities (it is estimated that from five to 20 per cent of Canada's student population has some form of learning disability) have not always been adequately served by the conventional school system, largely because of cost and lack of facilities or staff. In a long-range program of research, development and evaluation in the field of computer-aided learning systems, the Council has collaborated with teachers and educators at all levels in an attempt to get insight into the range and

nature of the problems that might be tackled using available technology. As part of the program, a terminal and related software have been developed which permit computer-controlled testing of learning abilities. This development has been carried out in collaboration with Carleton University, the Rideau Regional Hospital School and the Eastern Ontario Children's Hospital. Results of initial tests conducted by these institutions have been very encouraging and the development of a prototype portable terminal based on this work is currently being undertaken by Lektromedia Ltd., of Pointe-Claire, Quebec. The terminal is packaged in units which can be carried as airline luggage and incorporates slide presentation, random access audio messages and a touch sensitive input device permitting the tests to be administered without requiring the subject to possess any special skills to operate the terminal. The terminal also incorporates a unit to provide a printed record of the test results.

"Throughout the years," concludes Program Manager Orest Roy, "the prime objective of our efforts has been the application of science and technology to individual needs for self-sufficiency. During this International Year of the Child, we feel that exceptional children should have their fair share of attention and the assistance they need to become productive members of our society." □

Joan Powers Rickerd