Child's world

Cradled in the arms of research

The International Year of the Child focusses attention on NRC's biomedical engineering research program to assist the exceptional child.

Susan is in immersion. "Well, Susan," asks the teacher, "what are you going to do after school today?" With determined effort, the six-year-old formulates her answer, not verbally in English, French, German or Spanish, for she cannot speak; but through a portable communication unit conceived and developed by the National Research Council's Biomedical Engineering Section, in cooperation with the Ottawa Crippled Children's Treatment Centre, she replies: "I go to friend's house." Self-expression is now a little easier for children like Susan, who suffer from cerebral palsy, and who up until recently have had no means of expressing such complex ideas.

Tommy sees children in their Big Wheels. It looks like fun. Just a year ago, children with Spina Bifida (a spinal condition which in most cases completely paralyzes the lower limbs) could not enjoy the same play activities as their friends. Today, a Caster Cart resembling the Big Wheel is being custom-designed for them by the Section's Rehabilitation Technology Unit. David and Janie can now enjoy their favorite pastime, checkers and steeplechase, through the use of specially-designed electronic games developed by the Section for children physically incapable of playing the conventional ones. And Paul, who suffers from a rare disease which limits joint movement in the hip, knee and ankle, can ride his bike again because the Section has modified it in such a way that the pedals do not have to make a complete circle. The list of aids and techniques is virtually endless, starting with the very cradle of life itself – a novel portable incubator which features better heat, oxygen and humidity control, making the crucial period after birth safer and more comfortable for the premature infant.

Communication and mobility – for more than a quarter century these two themes have formed the base for NRC's biomedical engineering research program to assist the physically disabled.

It is through language that the young child interacts with and gains information about the world around him; through speech, the verbal use of language, the pre-schooler is able to satisfy his immediate physical needs, ask questions, form ideas, develop socially and cognitively, and attain a sense of individuality and self-worth. But what of the child that cannot speak? That cannot communicate? Even though that child may be aurally and mentally astute, no viable mechanism for communication with people exists. As a result, social and cognitive development are retarded, often compounded by any physical impairment. Even pointing to a picture to indicate something that is needed becomes a tremendously complicated task usually requiring assistance from an adult. Since visual perception is usually not impaired, however, a visual means of communication lends itself naturally to the problem. One approach which is proving quite successful is the use of a symbolic language called Bliss (named after its Australian inventor) symbols. Instead of employing alphabetic characters as in English or French, this language makes use of a large number of graphic symbols, at times pictographically related to the concepts they represent. The symbols represent both objective concepts, such as "house", "food", and subjective concepts such as "this", "happy", etc. During operation of the system, the child selects an item of information using input interfaces specially constructed by the Section to accommodate varying degrees of dexterity. A child with sufficient manual ability, for instance, could depress large keys,

Specially-designed adjustable handles help this youngster secure a firm grip on his walker. *(Photo: Bruce Kane, NRC)*

Des poignées ajustables de conception spéciale aident cet enfant à s'agripper plus fermement à sa trotteuse. *(Photo: Bruce Kane, CNRC)*