INTRODUCTION

Throughout the world there is a growing awareness that societies have much to gain by meeting the needs of persons with disabilities. At the same time there are tremendous technological advances being applied to these needs. Seldom has the timing of a social movement such as the disability rights and independent living movement coincided with opportunities offered by an emerging technology.

While there is considerable commonality among countries, in regard to both the needs of persons with disabilities and the interest in assistive technology to meet those needs, there is also great diversity among countries with regard to the social, economic, cultural, and political contexts in which technology and disability are interacting.

This issue of *Technology and Disability*, titled "International Perspectives," captures some of the similarities and differences in assistive technology as it is applied throughout the world. The articles in this issue are of two types. Some articles provide an overview of assistive technology, or some aspect of it, in one country or region of the world. Other articles discuss an issue or a technology from a worldwide perspective, cutting across diverse countries and regions. Not all regions of the world are represented; however, there is enough geographic diversity in this sample of articles to provide an "international perspective." The reader will also find "high tech," "low tech," and "appropriate tech." There is technology for all ages—children, youth, adults, and the elderly. Finally, the perspectives of both developing countries and industrialized countries are represented.

The first three articles address topics that extend beyond any one country or region. The first article focuses on the need for mobility, and how it may be achieved. In "Building Wheelchairs, Creating Opportunities: Collaborating to Build Wheelchairs in Developing Countries," Henry Hof, Ralf Hotchkiss, and Peter Pfaelzer point out that there are 20 million persons in developing countries needing wheelchairs who will probably never have one. Moreover, many of the wheelchairs that are available are not appropriate for conditions in developing countries. The authors outline the types of wheeled mobility suitable for developing countries, and for various levels of disability. They discuss in depth the technical characteristics of wheelchairs for developing countries and the types of organizations for producing them. They also describe a new United Nations program that provides assistance for local workshops, staffed largely by wheelchair riders. Hof, Hotchkiss, and Pfaelzer raise important questions about technology transfer.

The second article, by John H. Stone, discusses the process of "The International Transfer of Appropriate Assistive Technology." Stone examines technology transfer on three levels: (1) among individuals; (2) among rehabilitation professionals, persons with disabilities, and the community; and (3) among countries, especially between the developing and developed countries. Stone perceives in several recent projects the emergence of a new paradigm for international technology transfer that avoids both imperialism and isolationism.

Paul R. Ackerman, the Director of International and Interagency Activities of the National Institute on Disability and Rehabilitation Research (NIDRR) in the United States, provides us with the perspective of a U.S. governmental agency charged with developing and sharing rehabilitation and disability research with other nations. In "The International Role of the United States in Technology and Disability: The NIDRR Perspective," Dr. Ackerman discusses policy dilemmas faced by NIDRR in its mission to develop and share assistive technology. He argues that the primary role of the United States should not be to furnish devices or equipment produced in the U.S., but rather to exchange expertise through consultative visits by specialists in assistive technology. Such an approach helps developing countries strengthen their own capability. It also develops technology to fit the unique needs of each country.

The next two articles describe some of the most recent research and development in assistive technology in two very significant areas of the industrialized world—Japan and Europe. Masami Shinohara and Yutaka Shimizu take us on a tour of some very exciting work being done in "Research and Development of Assistive Technology for Persons

with Sensory Disabilities in Japan." The authors focus on communication and mobility aids for the blind and visually impaired, and on speech reception and training aids for the hearing impaired. Overcoming problems in the use of Braille word processors and readers with the Kanji (ideographical) character system is one of the difficult technical challenges that Japanese researchers face. Shinohara and Shimizu also describe work in progress in Japan on object detection and navigation aids, hearing aids, artificial ears, auditory substitution systems, and speech and language training aids.

European countries have developed mechanisms for joint research and development within the framework of the European Communities Commission. Pier Luigi Emiliani, of the Italian National Council of Research, describes several "European Telecommunications Projects for Persons with Disabilities" developed within this framework. Emiliani explains how research is organized in this sector, discusses current research priorities, and gives detailed descriptions of several projects.

The cost of assistive technology is a problem in even the wealthiest countries. Two articles discuss systems in Sweden and the United States for financing the acquisition of assistive devices by persons with disabilities. There are significant differences in the economic systems and social policies of these two countries, and the two articles together highlight these differences.

Marti G. Parker and Mats Thorslund describe "The Provision of Assistive Technology for the Elderly in Sweden." Within the Swedish welfare state, assistive technology, an integral part of health care for persons of all ages, is financed, prescribed, and distributed through the national health care system. The advantages and disadvantages of the Swedish system are discussed. The authors also provide data on the prevalence and use of assistive devices by older persons. The Swedish system for providing devices was developed primarily for younger persons with disabilities, at a time when the number of devices was limited. The increase in the population of older persons, along with the increased number of devices, is now presenting challenges for the Swedish system.

The system of financing assistive technology in the United States is also facing serious challenges, but for different reasons. In Sweden, assistive devices are prescribed, furnished, and financed through the government's health care system. In the United States more than half of all devices are purchased by the user from the private sector. Sometimes all or part of the cost is paid for by the government or by private health insurance companies. However, criteria are not clear and are not consistently applied.

The National Council on Disability has recently completed a study on the subject for the U.S. Congress. The article by Council Chairperson Sandra Swift Parrino, "Recommendations for Financing Assistive Technology in the United States: A Study by the National Council on Disability," presents a summary of the final report. The timeliness of the report makes the publication of the article in this issue especially significant.

An analysis of the economic and social benefits of assistive technology is included. Assistive devices are often costly, but the cost of not making them available to persons with disabilities is also significant. The report identifies and analyzes many flaws in the financing system, summarizing them in 12 findings. Sixteen recommendations are presented which address these flaws. Among the recommendations are standardization of criteria, better information to consumers about their rights within the system, more interagency coordination, and new tax policies.

Indira R. Kenkre provides us with a view of the status of assistive technology in India. Her article, "A Pragmatic Approach to the Use of Assistive Devices in India," includes a description of the use of assistive technology for preventing disabilities, as well as for enabling persons to live with them. The author also reminds us of the importance of integrating assistive technology into local culture patterns, and provides examples of this in India.

A hemispheric perspective is provided by Frederick J. Krause of the Partners of the Americas. In "Bridging the Gap: Technology and Disability Projects of the Partners of the Americas," Krause describes the Partners' activities in the field of disability and rehabilitation. These projects are characterized by volunteers working together in

"sister-state" partnerships. The projects stimulate local efforts to develop and utilize low-cost devices, using resources available in the community.

Assistive technology that enables persons with sensory disabilities to communicate more effectively is the subject of the next three articles. These describe aspects of the technology in Sweden, Japan, the United States, and Thailand. In "Using New Technology in Communication for People with Speech and Language Disabilities in Sweden," Jane Brodin and Magnus Magnusson discuss innovations in visual communication, remote communication, graphics-based communication, and picture communication.

The integration of assistive technology into daily life depends not only on the acceptance of the technology by persons with disabilities but also on the reactions of other persons with whom they interact. In "Attitudes and Impressions toward Receiving Phone Calls Made with a Voice Output Device in the United States and Japan," Kenryu Nakamura, Gregg C. Vanderheiden, and Roger O. Smith provide us with a cross-cultural comparison of reactions to a technology by which nonspeaking individuals may use the telephone. The study investigated the attitudes and behavior of employees of public organizations and private businesses toward telephone communication that they received from nonspeaking individuals using a voice output device. Besides providing interesting insights into the ways in which people initially react to such communication, the article offers several practical suggestions for making such communication more effective.

Speech output is also the subject of the article by Wararat Wungsoontorn of Thailand entitled "A Comparison of High-End versus Low-End Speech Output Systems." However, the focus of this article is on the use of speech output by persons who are blind. The author compared the effectiveness of two systems that have significantly different costs. The author's research was carried out in the United States. In an interesting postscript, Ms. Wungsoontorn relates the current status of such technology with persons who are blind in Thailand.

Although this collection of articles offers some new international perspectives, it only scratches the surface of international developments in assistive technology. As technology in all fields advances rapidly, the world shrinks, and we become more and more a global community. The information and perspectives in this issue should help in making us all better citizens of that community—particularly in our ability to apply technology to the needs of persons with disabilities.

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