

" . . . AND SENSORY AIDS II "

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. . . an editorial

In this Bicentennial Year we wish to note two other less auspicious anniversaries; completion of "twenty years before the mast" for H. Freiberger in the prosthetic and sensory aids (now rehabilitative engineering) research program of the VA and the passage of ten years since the publication in BPR 10-5, Spring 1966, of Dr. E.F. Murphy's namesake editorial ". . . And Sensory Aids." We have been enlightened this year by vignettes from our Nation's 200-year history affording us the opportunity to see clearly some of the by-now nearly forgotten or fading threads which, woven together, yield the great colorful tapestry that is America. Not claiming that the state of sensory-aids development today is like a magnificent tapestry with all the threads and details in place contributing to a unified whole evident to anyone who looks, I shall, nevertheless, by recalling events of the past ten years, try to lead up to the unveiling of a grand sensory-aids tapestry which I forecast for some time in the 1976-1981 half-decade.

Back in March 1967 at a meeting of the Sensory Aids Subcommittee of the NAS-NRC Committee on Prosthetics Research and Development (CPRD), the Chairman, Professor Robert Mann, indicated he thought the Subcommittee should be upgraded to full committee status appropriate to the importance of the field of concern—sensory-aids research for the visually and auditorily handicapped. Although this never came to pass, several committees in the NAS and NAE organization served our field almost to the end of 1976, by which time organizational changes both in the advisory academies and the Veterans Administra-

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tion (VA) led us to a somewhat different system to effect merit review of research proposals.

I suppose there is nothing new in my saying that quality evaluation of research proposals is a key ingredient in a productive and responsive research program. We have never found it easy to select reasonably detached, comparatively unbiased, yet thoroughly knowledgeable individuals to serve as reviewers of proposals or programs. We are sometimes faced with the dilemma that within a group of carefully selected reviewers one will rate a given proposal with the highest grade possible, and another will recommend flat disapproval. We hope that when all the facts are on the table and the reviewers have a chance to interact among themselves and with the decision-making research officials, the decision taken is as correct as is humanly possible in the circumstances of finite resources and fallible mortals.

It was in December 1967 that my friend and worker for the blind Robert L. Robinson telephoned the doleful news of the passing of John K. Dupress, an esteemed colleague who inspired many to devote their energies to applying technology to mollify the problems of the blind and disabled in general. Mentioning these two blinded veterans recalls to mind the unresolved question as to whether it is an asset in serving a disability group to be oneself a member of that group. As with everything in this life, especially where people are involved, there are the pros and the cons. Great contributions have been made by blind people and sighted as well. I shall simply retreat behind the trick but quite wise phrase, "It's not the disability but the ability that counts." Also one should note that VA policy of choosing persons who have experienced and successfully adjusted to a major disability for staff prosthetic representative positions has worked exceptionally well.

In early January 1968 a Memorial Service was held for John K. Dupress in MIT's Kresge Auditorium. While discussing this with David L. Schnair of the Blinded Veterans Association (BVA), and reminiscing about Dupress and how he died, Schnair suggested that blinded veterans living alone should have push-button telephones to enable them more easily to call for help in times of tension, weakness, or confusion. This reminds us of how a device designed and developed for the general public sometimes unexpectedly is a boon to the disabled, and conversely how products having their origins in designs for the disabled (like slow-speed phonograph discs) often have values for other populations as well.

Hopefully, simple problems have simple solutions. Blinded people for years had been using braille watches as pocket timepieces, but in 1969 we first came on the problem of a watch for a blind bilateral hand amputee. "Reading" the watch with the tongue some considered unseemly. Repeater chiming watches previously used in such instances had become

rare collectors' items often costing thousands of dollars. The annunciating clock from Japan hardly was pocket sized and needed electrical power. Use of WWV time ticks did not seem a fully reliable solution. We have not yet come on a solution that is suitable, feasible, and acceptable. One could probably compile a dossier of problems such as this, awaiting solutions good enough so that people will accept, use, and benefit from them.

It was in 1969 that the VA received its first six model C-4 Laser Canes, three Lindsay Russell Pathsounders, and the Sonicguide. Collapsible canes without electronic embellishments have come and gone over the years with a few surviving the tests of usefulness, durability, and reasonable cost. The uninitiated, and often those in the business too, ponder over why the number of blind persons with no useful travel vision and the number of accomplished users of any of the above electronic devices is so discrepant. The complete answer still eludes us but playing a part are probably the high cost-effectiveness ratio, prospective users' lack of knowledge and hesitancy to try something new, counselors and instructors not fully informed and trained, and problems associated with maintenance and repair.

In calculating the cost-effectiveness ratio, not only the high dollar cost of the equipment must be included, but also the other costs or "investments" a user and society must make. The "effectiveness" term in the ratio is lowered by the shortcomings in each of the units. The Pathsounder and Sonicguide are secondary aids and generally need to be used along with a primary mobility aid such as a long cane or dog guide. The electronic features of the Laser Cane can become unreliable when there are transparent obstacles, in certain instances of specular reflection, and when curbs are small or are approached at an oblique angle. Certain of these retardants are amenable to elimination with the passage of time, and I think this is happening. Others await technological and production improvements which also will come. It seems to me that early warning of features in the travel path and some knowledge of the immediate environment beyond the reach of arm or cane are worthwhile cues for the independent travel of many more blind persons than are currently employing them.

Events and experiences in 1970 made it feel like a banner year in sensory aids for the blind. We saw our first compactly-packaged Optacon in the corridors of the State Capitol at Austin, Texas, the day blinded veteran Criss Cole became Governor of Texas for the day. Wormald Vigilant Limited, of Christchurch, N.Z., commenced production of 30 prototype units of the Binaural Sensory Aid (later to be called Sonicguide). Dr. Samuel M. Genensky hosted a group of us at his Santa Monica offices at the Rand Corporation explaining his ideas about closed circuit television (CCTV) magnification for the blind. I was

stricken by an interesting information-theoretic dilemma that day as some in our group seemed to say the best possible image of print is perhaps *not* the prime desideratum for the partially sighted. I later realized the task at hand is what governs. The partially sighted person desires to read the print, to extract the information contained therein, *not* to see an image of highest fidelity. Thus, complete reversal of black for white, hardly high fidelity reproduction, is favored by many. It reminded me of the lookout's task at sea in time of war—to see and be confused by the details of a camouflage pattern was generally *not* the task, but rather to see that a ship was there.

In March of 1970 we saw Dr. Paul Bach y Rita's tactile visual substitution system at San Francisco's Smith-Kettlewell Institute of Visual Sciences. We were not persuaded then that this device would evolve rapidly into a routinely usable general purpose visual prosthesis, and even today, despite several groups' efforts, we still await such evolution. In October 1970 the VA purchased its first two CCTV units from a commercial source. This early purchase of the then quite costly devices is believed to have been a major accelerant in the development of the CCTV magnifier business as we now know it. The 25th Anniversary Program of the Committee on Prosthetics Research and Development (NAS) and the Prosthetic and Sensory Aids Service (VA) was an inspiring event in our history fittingly held at the Mayflower Hotel in Washington, D.C. in October 1970. It seems to have been a turning point, presaging a series of reorganizations and changes as new officials replaced the old and new ways were proposed to solve the rehabilitation problems of the times.

In response to a Presidential initiative that the results of research should be applied with less delay to benefit the people, and in furtherance of the existing plan to have personnel at each VA Blind Rehabilitation Center (BRC) who were funded from Program 822 prosthetics research funds, we added Mr. Richard R. Bennett to the staff at the Western Center March 8, 1971. He joined Messrs. Harvey L. Lauer, James J. Whitehead, and Leicester W. Farmer who were similarly serving, at least part time, at the Central Center. Viewing the series of steps, often with accompanying iterative feedback loops, which many agree delineates the process by which devices come to serve disabled people (i.e., sensing a need, formulation of a concept, research, development, test, evaluation, development of support systems, and deployment to the target user group) we felt "research" people should be there at or near the deployment stage. It is to facilitate rapid and successful introduction of new devices and ideas that we fund six researchers divided among the three BRCs. They work with researchers, otherwise funded, both within and outside the VA to accomplish this vital and often quite difficult task.

Interagency cooperation was demonstrated when we all were invited

to the Sensory Prosthesis Feasibility Workshop at the National Institutes of Health in Bethesda, Md., early in 1971. All the results of researches on chronic electrical stimulation of delicate tissues discussed at that Workshop are not yet in, but when they are I feel they will mean much to progress in ensuing years.

The Rev. Thomas J. Carroll, a man who had an unusually benign effect on many blinded veterans, blind adults, and workers in the field, passed from among us April 24, 1971. A man with inspiringly strong convictions, a highly developed social consciousness, and an engaging way about him, there is no doubt about his contributions to peace (inner and outer), ecumenism, and work for the blind. At the time of Father Carroll's death the first instructors' course on the Binaural Sensory Aid (Kay Spectacles, now Sonicguide) was underway in Newton, Mass., only a stone's throw from St. Paul's Rehabilitation center of Boston's Catholic Guild for All the Blind, later the Carroll Rehabilitation Center for the Visually Impaired, renamed in memory of the man who contributed so much to the facility. This little bit of history confirms the often overlooked need for good training in the use of most rehabilitative aids, training to be provided by well-prepared instructors. It also tells us of shifts in levels of parochialism, witness the name change to Catholic Guild for *All* the Blind, and of new sensitivities and in expansion of scope suggested by the term *visually impaired* rather than blind.

It is easy for me to remember when the American Foundation for the Blind (AFB) started operations (1921) because that is my birth year too. The similarity just about ends there though as I recall our 50th Anniversaries in 1971—AFB's sparkling event at New York's famed Plaza Hotel with the International Seminar on Science and Blindness, with forecasts of many hills yet to climb and many solid plateaus of achievement to be reached in services to the blind, my own birthday barely heightened (maybe even a little depressed) by the cardinalship of the quinquagenarian point.

Much has been said about the Vietnam veteran and how he differed from his confreres of earlier conflicts. There is no doubt in my mind the world has changed and is changing rapidly, but about the veteran changing I am not at all so sure; in fact whenever I think of this I cannot shake from my mind a bit of French I remember: "Plus ça change, plus c'est la même chose." This question was argued at a Conference on Blinded Veterans of the Vietnam Era held in April 1972 under joint sponsorship of the American Foundation for the Blind, the Blinded Veterans Association, and the Veterans Administration. Although no definitive answer to the comparatively academic question emerged, the jointly sponsored conference was a formal manifestation of the easy, cooperative, and constructive relationship between these three organizations.

It was in August 1972 that Dr. Gustav Haas joined the staff of CPRD to strengthen their abilities in the sensory-aids area, particularly for the hearing-impaired. In retrospect it is hard to say whether he joined a ship still steaming full ahead into new oceans with new challenges, or one already slowing with the breakup yard not too far over the horizon. A series of events quite beyond my powers of explanation did occur over the succeeding four years which effectively removed the CPRD from the scene after over a quarter of a century of service.

In 1973 we saw the retirements of Dr. Thomas E. Knox who labored for as long as I can remember at VA's Central Office to insure the best for veterans in eyeglasses and hearing aids while not breaking the taxpayers' backs in the process, and Robert Bray of the Division for the Blind and Physically Handicapped at the Library of Congress, a man who made a notable impact by doing so much to make the gold of the printed word available to those who couldn't read ordinary print. We in VA have been and still are involved in that tantalizing problem of making the world of print, a world of centuries-old evolution and design for interaction with vision, accessible to those without adequate vision. In 1973 we received the first order of 50 Stereotoners, a device aimed at solving the reading problem. The Stereotoner and the Optacon, both direct-translation devices, the one using the sense of hearing, the other that of touch, to convey print to the blind person—both enable some totally blind people to read, independently and reasonably effectively, a satisfying variety of ink print.

For a series of reasons only partially understood even today, neither of these devices has proven signally successful as an aid for any large number of blinded veterans. The search for a reading machine for the blind has continued, and concurrent developments in electronics and computer science facilitating the latest designs now give one the distinct feeling that we are indeed getting closer.

The quite productive Workshop on Communications and Sensory Aids for the Deaf-Blind held in November 1973 at the National Center for Deaf-Blind Youths and Adults (recently renamed Helen Keller National Center for Deaf-Blind Youths and Adults) with help from CPRD, reminds us of the need always to consider those with more than one disability. This is more frequent than we like to believe, the concatenation of two or more disabilities often being much more seriously disabling than one would expect if he were accustomed only to linear combinations of effects.

In early 1974 we received our first shipment of 35 Model C-5 Laser Typhlocanes. Under an initiative of Russ (Russell C.) Williams, distinguished VA Chief of Blind Rehabilitation, training workshops were held in mid-1974 for members of Visual Impairment Services Teams (VIST). One of the points touched on was the availability of high-technology

devices such as the Laser Typhlocane and the Sonicguide (the latter initially available at that time only for instructors in Australia and at Western Michigan University). We have always felt that familiarization of counseling people with the newest devices is of prime importance in the deployment of such devices.

It was in July 1974 at the BVA Convention in Denver, Colorado, that we first heard in any detail of the Kurzweil Reading Machine. We followed developments of this device, later arranging to purchase one unit for our trials and evaluation. Delivery has been promised for April 1977. This device, and others being designed in other shops to do a similar job, is one that gives substance to the previously voiced sentiment that we are relatively close to an unfolding of great things in the sensory-aids field.

In 1975 we were reminded of the great importance of ministering to the large numbers of those with low vision, sometimes neglected as the middle group between those who are totally blind and the ordinary population which uses "ordinary" visual aids such as eyeglasses, sunglasses, binoculars, magnifiers, microscopes, or telescopes. The Workshop on Low Vision Mobility at Western Michigan University, funded by the Veterans Administration, served as the reminder, and the published report of the Workshop continues to alert readers worldwide.

In November of 1975 AFB used a press conference to introduce devices such as a paper money identifier, a calculator with braille output, and one with a spoken output. Seeing such devices and the many others listed in AFB's annual and international catalogs shows that the field of sensory aids for the blind comprises many areas beyond those of reading and mobility devices.

The last year in our decade of consideration, 1976, saw on its first day announcement of a new company, Wormald International Sensory Aids Ltd., producer of the Sonicguide and also undertaking to manufacture the Mowat Sensor. It is an encouraging sign that the number of companies, and divisions within larger organizations, committed to sensory aids deployment and having more than a fleeting half-life time, is increasing. Also the often non-dramatic aspects such as procurement, client counseling, training, repair, maintenance, transportation, and followup are becoming somewhat more regularized, though much can still be done in these areas.

Best care for our elderly blind people (they have long been with us in large numbers, and are on the increase) was the principal topic at a meeting at VA's Geriatric Research and Education Clinical Center at Bay Pines, Florida, in February 1975.

New equipments arrive at our center in New York at a higher than average rate in 1976: the Telesensory Systems, Inc., Speech Plus Calculator; Science for the Blind Products' braille-output calculator; Master

Specialties Company's Audio Response Calculator, and Triformation Systems, Inc.'s Snipas Glucose Analyzer. These all complement the older devices we know, and bode well for the future of the sensory aids field. A procurement specification was ready in March 1976 to formalize VA's intention to purchase one of the Kurzweil Reading Machines to be evaluated with blinded veterans in mind initially at our Hines, Illinois, center. Also at that center a meeting was held in June 1976 where emphasis again was placed on the low-vision client and his care, with some particular reference to the role of the optometrist in such a service.

From this recounting of but a few of the events of the past decade I think you can perceive that progress *is* being made, that the stage is set with comparatively good actors, and that my forecast for the completion and unrolling of a masterwork sensory-aids tapestry within the next five years is not too optimistic.