

1945—1970 . . . AND THEN ?

. . . *an editorial*

Eugene F. Murphy, Ph. D.
Chief, Research and Development Division
Prosthetic and Sensory Aids Service
Veterans Administration
252 Seventh Avenue
New York, N. Y. 10001

In 1945, as now again in 1970, a long era of battles left not only deaths but amputations, paralysis, blindness, hearing loss, and other disabilities among many survivors. In fact, those very medical successes which led to survival rates of many severely wounded patients higher than those in previous wars had left the survivors with serious disabilities—especially in those categories so poignantly and dramatically visible to the general public, the news media, and the Congress.

The situation in 1945, especially as amputees were discharged from military hospitals with serviceable but supposedly temporary artificial limbs, was outlined in an editorial by Dr. Stewart in the Spring 1965 issue of this Bulletin on the twentieth anniversary of the VA prosthetics program. He pointed out the chaos of the post-war period, the fragmentation of services in procuring artificial limbs by routine methods proven suited to more standardized commodities, the problems of the small artificial limb industry, and the accomplishments of the newly centralized prosthetics service in its first twenty years. Among early and important innovations were negotiated multiple contracts with limb facilities, the freedom of choice of facility thereby permitted to individual amputee beneficiaries, the unique corps of prosthetic representatives with technical and administrative abilities plus personal qualifications, and the inauguration of a credit card system permitting prompt repairs. These unorthodox features continue to allow outstanding service to increasing numbers of veterans on an individual basis suited to special needs, yet they also meet new needs which could scarcely have been foreseen in 1945.

The achievements over two decades of the prosthetics research program were appraised by Mr. Talley in his editorial in the Fall 1968 issue of this Bulletin. After listing a series of technical improvements—alone deemed worth the cost of the program—he then demonstrated that the modest expenditures on research had far more than paid for themselves in terms of avoidance of increased costs to be expected from

extrapolation of 1948 costs for artificial limbs and repairs. He attributed much of this cost avoidance to the better service provided by clinic teams. These arose from the early followup of the suction socket program and continued to flourish, first with the stimulation of the upper-extremity schools and field studies and then of other aspects of intramural and university-level prosthetics education.

Formal education has been supplemented by continuing publication through many media of results of the research program. It is gratifying that the major books "Blindness," edited by Zahl, and "Human Limbs and Their Substitutes," by Klopsteg, Wilson, et al., not only were compiled and published largely by the research program but proved so popular that reprint editions were necessary. "Orthopaedic Appliances Atlas, Volume 1" is currently being revised, Volume 2 is routinely used, and almost 1000 requests have been received for notification of availability of a compendium of "Selected Articles from 'Artificial Limbs,'" reviving classic papers long out of print. Early issues of this Bulletin, too, are out of print.

The history of prosthetics, as well as of the whole VA medical program, has been traced colorfully and in some detail under the direction of Mr. Adkins in *Medical Care of Veterans*, published by the Government Printing Office in 1967. This background is important for understanding current positions and trends.

Some major past achievements as well as future opportunities understandably have scarcely been mentioned in these reviews. The schematic diagram inside the front cover of this Bulletin merely hints at the variety of activities at many locations forming part of this complex, coordinated, and dynamic prosthetics program.

The Prosthetics Distribution Center at Denver not only carries out its original function of distributing fresh supplies of stump socks and hearing-aid batteries to individual beneficiaries economically, periodically, and conveniently but also has undertaken distribution of long canes for the blind. Its centralized nationwide repair service for hearing aids can provide immediately some simple repairs, channel more complex repair jobs to the appropriate factories, and allow each factory to deal efficiently and promptly with a single Center instead of with a large number of field stations and a host of individual veterans. In addition to the considerable economic benefits of this centralized program, there should be substantial opportunities for research information and improved quality control.

The great ranges of research and development activities of the VA Prosthetics Center are reported in each issue of this Bulletin, both in scientific papers and in a lengthy semiannual report. The important clinical activities and the distribution of prosthetics components or prefabricated appliances, though representing major activities of VAPC,

are barely mentioned in this research-oriented report.

Increasing emphasis is being given to Prosthetics Treatment Centers at key geographical locations, each unifying various prosthetics activities under supervision of a prosthetic representative. Five Centers are now in operation, and a total of 21 has been approved for activity in the near future. The goal is to provide excellent and comparable services for all patients, wherever located. Stations which do not have a staff trained in prosthetics or specialized prosthetics facilities may, upon mutual agreement, transfer cases to the nearest Prosthetics Treatment Center for complete prosthetics care by more knowledgeable staff with specialized facilities. These Centers also provide excellent opportunities for teaching and for participation in research, development, and clinical application studies. Complex cases, particularly those with multiple disabilities, should receive better care at these specialized yet coordinated Centers based on recognition of the interrelationships between disabilities. For example, even bifocal glasses complicate amputations and prosthetics problems. Conversely, trifocals might be needed to facilitate lip reading by a hearing-aid user at realistic distances.

Sensory aids have received steady attention, with increasing amounts in the past decade or more. Both clinical and research programs are closely integrated. Dramatic results can be expected in future years.

Hearing aids are provided in cooperation with the VA audiology program, based on independent tests by the National Bureau of Standards, computations at the VA Hospital, Washington, and review by a distinguished group of consultants. A detailed report of test data and of relative ranking of all aids tested, on a composite scale considered important for VA needs, is available from the Superintendent of Documents, Government Printing Office. Current research on hearing aids aims at better understanding of the relations between clinical value of an aid, its measurable physical properties, and methods for selection of the most useful aid for each individual patient.

The VA program for rehabilitation of blinded veterans arose from the military experience of World War II. This story was told last year by C. Warren Bledsoe in "BLINDNESS 1969," published by the American Association of Workers for the Blind. The National Research Council's Committee on Sensory Devices, started by the wartime Office of Scientific Research and Development fresh from triumphs on radar, was supported for some years by the Veterans Administration. The clinical emphases have been on mobility with the long cane and on maximal use of other senses. Evaluation of the Signal Corps mobility aid, designed by Laurence Cranberg in the CPD program, then led through many years of development (as described by J. M. Benjamin in a recent issue) to the present laser cane which is being tried cur-

rently at several blind rehabilitation centers. Plans are also being made for evaluation of ultrasonic "spectacles," collapsible canes, and other aids.

The reading needs of the blinded veterans are approached not only by Talking Book, magnetic tape, and energetic introduction of braille but by a systematic program of research and development on a spectrum of reading aids. The Veterans Administration supported development and early evaluation of the RCA "reading pencil." A series of technical conferences on reading machines for the blind have brought together many disciplines involved, leading to general agreement on need for a broad spectrum of research and development. Several devices have now reached substantial clinical trial, and over the next few years there should be dramatic advances in systems for either personal use or library-type service. A far goal, perhaps, is a true visual prosthesis, but meanwhile there are many important stages.

Eye glasses are needed, not only for those partially sighted though legally blind veterans who need high powers but for much larger numbers of eligible veterans with more conventional prescriptions. The Veterans Administration has supported development of specifications and test methods at the National Bureau of Standards as well as participated in the preparation of American National Standards Institute Standard Z-80.1, First Quality Ophthalmic Lenses, potentially protecting millions of spectacle wearers. VA representatives are currently active in revision of the first standard.

Unheard of in 1945 by the typical physician as well as by the patient, such devices as cardiac pacemakers and home dialysis units have now become low-volume yet important and high-cost parts of the prosthetics program. Use of these and of many other bioengineering developments surely will increase rapidly in the next decade, aiding the patient but increasing cost and complexity of the program and requiring new studies.

A widening range of medical accessories, lift aids, standing devices, and wheelchairs is available to help the severely disabled. These devices particularly aid the paraplegics and quadriplegics who not only survive in increasing numbers some serious accidents which formerly were fatal but who have increasing years of vigorous, meaningful life expectancy which should be made fruitful.

The Veterans Administration's role has been unique in these many fields. These diverse activities seemingly fall in the provinces of many separate disciplines, yet they have numerous common problems and analogous solutions. A quarter of a century of integration under a single Prosthetic and Sensory Aids Service has facilitated building upon common factors, aided by inherent coordination between the vigorous research program and the imaginative operating facilities with a service

mission, both under truly exceptional legal mandates and prerogatives. Thus, research, development, and early service tests have led smoothly to substantial "pump-priming" purchases of early models for clinical trials on eligible veterans, feedback of data and engineering to the manufacturers, dissemination of results to clinicians serving not only veterans but many other elements of the population, and inherent mechanisms for development of realistic specifications and for effective quality control. This unique, interdisciplinary, and relatively small program has been far more effective in launching major improvements than could have been expected from mere publication of results by one group, isolated purchases by others, and grass-roots care by widely scattered clinicians and small shops. Continuity has been a watchword.

What then? Any long-term program runs the dangers of coasting smugly into the dangers portrayed in Parkinson's satires. Continued vigorous effort, critical analysis, and watchfulness are always in order. With them, though, and with continued and expanded support for training, operations, and research, the VA prosthetics program should be able to serve the new generation of severely disabled even better than it has aided not only the veterans of prior conflicts but indirectly the far more numerous victims of diseases and trauma in many lands.