Address by George T. Aitken, M.D.

Chairman of the Committee on Prosthetics Research and Development

at the

AMERICAN ORTHOTICS AND PROSTHETICS ASSOCIATION ASSEMBLY BANQUET

New Orleans, La., November 6, 1963

President Fillauer, distinguished guests, ladies, and gentlemen:—

You represent the membership of a large association dedicated to the fabrication and fitting of prosthetic and orthotic devices. As such, you should be vitally interested in research and development, education, current and future medical needs, and the attitudes of national groups involved in these endeavors.

As an orthopedic surgeon, a member of that surgical specialty that is a prime user of your devices and skills, I would like to explore some of these areas with you.

Medicine and surgery are changing. A new era is evolving, characterized by more precise understanding of disease and its causes, with a resulting more precise and direct attack on cause rather than symptoms. This, plus the near eradication of some conditions through improved prevention or treatment techniques, has changed the character and frequency of some portions of medical and paramedical practice. Not too many years ago, poliomyelitis or "infantile paralysis" was an endemic disease with recurrence at intervals of epidemic proportions. This most severe of the neuromuscular disorders produced a nearly endless variety of extremity deformities and malfunctions. Such problems taxed the ingenuity of surgeons and orthotists to devise methods of external support that would improve function. From this stimulus developed the pantheon of braces that were a large part of the treatment armamentarium for this disease. Now—and thankfully so—this disease is a relative rarity because of induced immunity.

Not too many years ago, bone and joint tuberculosis was a common lesion. This disease also required external bracing as an adjunct to therapy. Now the chemotherapeutic treatment has nearly eradicated the bone and joint lesions, and the need for braces in this group is a minor one.

The bow legs of rickets have declined with the use of vitamins.

The previously large demand for braces in fracture treatment has at least been reduced by improved primary treatment techniques.

Such are a few examples of the changes in medicine. Changes, peculiarly enough, have always been the rule, and not the exception. Disease entities are found, studied, and, in some instances, either prevented, eradicated or else mastered. History teaches, though, that there seem always to be other equally formidable disease entities ready to present themselves with equally difficult treatment problems.

In the areas which are the greatest challenge to us, we are now seeing the evolvement of some of these *new* problems. They should be recognized, evaluated, and the challenges they present must be studied and eventually overcome.

Because there are drugs that prevent death from intercurrent infection, many of our severe congenital and post-traumatic para- and quadri-plegic problems are surviving to need the assistive devices necessary for even the most marginal rehabilitative techniques. This group of patients has only quite recently emerged as a serious challenge. Their needs are great and numerous. The solution will require a "new look" at the entire field of orthotics. In this group of unfortunate patients, weight of materials, fit, alignment, reduction of friction at joints, external power, and the whole problem of suspension and control assume a different magnitude of importance. To these people, support, mobility, and assistive function become a prime consideration. In the past we have thought of braces as primarily devices to prevent or limit motion and produce support.

The cerebral palsy cases present another major brace challenge. This group (too long relegated to secondary consideration) requires a kind of controlled mobility that has not previously been demanded in brace design and fabrication. Unnecessary, uncontrolled, explosive motions must be so braced that they are restricted and channeled into functional patterns. This requires freedom of motion in pre-determined ranges. Some solutions have been found, but much remains to be done.

Because medical methods and practices have made it possible for people to live longer, there is an increasing segment of our population called "geriatric." This group presents the problems of aging. Peripheral vascular disease is a major feature in this group. In spite of improved vascular surgery there is developing an ever-increasing volume of geriatric amputees. These are nearly all lower-extremity cases. Because of age, failing circulation, sometimes lagging hearts, and nearly always the reduced muscular vigor and the unsteadiness that characterize age, this group (if they are to have prostheses) requires something better than what we now offer. This is not to imply that what we have is poor—it is simply to emphasize that what we have was designed for a different type of patient. The geriatric group needs a prosthesis that solves its particular problems; not a prosthesis that fits them, as conceived for a young, vigorous adult.

In the geriatric group there is yet another problem that requires your assistance: the bracing of the post-cerebral vascular accident patient. Here we have a type of cerebral palsy, but the problem exists in an aging adult, not in a growing child. In the past, the short life expectancy of this type of patient deterred the extensive use of rehabilitation techniques. This is now changing. More and more, we are called upon to develop ambulation and improved arm function in these patients. In our practice we have been using devices and techniques that originally were devised for other problems in a different group of patients.

Lastly, in an area of particular interest to me, there is the problem of prostheses for children. Recent experience has conclusively demonstrated that prosthetic application in certain limb deficiencies in children is superior to classical surgical reconstructive techniques with or without braces. This has developed in spite of the fact that we have only a few specially devised components for this group of children. A great deal remains to be done for this large group of otherwise competent children. Here the introduction of external power is as important as it is in the bracing techniques for quadriplegics.

Brief as this survey has been, it should be evident that the changing face of medicine does in no way exclude or lessen your place. Quite the contrary; it demands a greater contribution from prosthetists, orthotists and engineers.

Many years ago, your techniques and skills were learned and developed in the traditional apprentice, journeyman, and master-craftsman type of process. The changing face of our society and the competition of an industrialized civilization have altered this approach to prosthetics and orthotics education. Currently you must compete for manpower and you cannot obtain the quality that you desire through such an apprenticeship plan. It has become necessary to formulate both prosthetic and orthotic device assembly, fabrication techniques, and the skills of fit and alignment into formalized patterns of instruction so that comparable results may be obtained by a wide variety of technicians simply by adherence to rather rigid formulae. Such a structuring of direction, plus the utilization of well-designed, modern teaching techniques in the hands of competent instructors, has produced our current University-sponsored prosthetics schools. This program has been of value and most of you are, I feel certain, in one way or another dependent upon the continuation of such a program. Unfortunately, an identical program has, as yet, not developed in orthotics. There is a great need for this, and this need is recognized by knowledgeable persons in this field. Pilot courses that have surveyed the current state of the art have been developed. From these and other endeavors in orthotics research and development will develop a fully structured program of orthotics education.

Your dynamic response to current prosthetics and orthotics education endeavors has been an important part of its success. Your continued enthusiasms will be necessary to develop an equally effective orthotics program. If the four-year degree program is to continue and expand, your enthusiasms and encouragement will be very necessary.

In the areas of research and development in orthotics and prosthetics there is much going on and much planning is being done to make this an even more effective program, particularly in the field of orthotics.

As many of you are well aware, government, as represented by the VRA, the VA, and other agencies, is intensely interested in prosthetics and orthotics research, development, and education. If it were not for the available federal funds, these programs would be much more modest and less effective. Because of the needs in prosthetics that were occasioned by the inflated amputee population following World War II, the emphasis by government in these fields was initially on prosthetics. Slowly but steadily, there has been increasing funding in the areas of orthotics.

The Vocational Rehabilitation Administration has a broad interest in this area. With their matching funds, they assist States in purchasing service in prosthetics and orthotics for their clients. At another level, they make grants that assist in developing schools of prosthetics and orthotics and further fund these schools to the extent that student expenses can be defrayed in part if such is necessary. At still another level, there are grants to pursue many types of research. This includes basic research, the development of devices and techniques, and finally they support efforts to make clinical application of new devices and techniques in order to evaluate their worth. VRA became interested in the brace problem early and has funded several of the pioneer basic research and development activities in this area.

The Veterans Administration was and continues to be a major supporter in research and development in prosthetics and orthotics. By virtue of this agency's responsibility to veterans, an initial emphasis on prostheses was necessary. Basic research and device and technique development, followed by clinical and laboratory testing, formed the broad scope of their activities.

As progress in the prosthetics field has been made, time, energies, personnel, and monies have been made available for orthotics research.

The Children's Bureau, like VRA a division of the Department of Health, Education, and Welfare, has also actively and continually assisted the overall development of a prosthetics program. Since, by law, this agency is unable to fund research directly, they have contributed their sponsorship to service programs. These programs have made it possible through care of patients to collect data at a clinical level relative to prosthetic management of children. From this endeavor have come a large number of design criteria which have guided development laboratories.

The National Institutes of Health has assisted also in this program through sponsorship at CPRD level. Funding here has assisted in publications, educational conferences, and has made possible some preliminary attempts to enter into the international prosthetics and orthotics activities.

Such is, in brief, the current status of federal participation in this broad bioengineering field. I may add that there is continuing enthusiasm and rapport at this level.

The Committee on Prosthetics Research and Development as currently constituted is vitally interested in this problem. At present there is being planned an evaluation program, specifically limited to orthotic devices and techniques. This is envisaged as a field or clinical test of devices and techniques so controlled and instrumented for data-collection that the validity of developers' claims may be evaluated. If this program does develop, it will evaluate new devices arising in development laboratories, and some non-research items that have seemingly worked well in certain regional areas, but have never had widespread use. The development of such a program will require that fabrication and fitting and alignment techniques be so formulated that they may be transmitted to new technicians. The prescription criteria and indications must also be defined so that the purpose, as conceived by the developer, may be communicated to other clinicians. Such an evaluation program will eventually produce not only an opinion concerning the worth of the device or technique, but will also lead to the preparation of the basic manuals that are so necessary to good educational programs.

As current Chairman of CPRD, it is my pleasure to assure you that there is an intense enthusiasm on the part of the Committee to increase the emphasis on orthotics. Research and development are being encouraged. The orthotics workshop sponsored by CPRD in 1962 was a great stimulus in this direction, and the results of that conference have been of assistance to sponsoring agencies in focusing attention on the needs and priorities in this field.

Over the years since it was established in 1954, the program journal, *Artificial Limbs*, has given wide dissemination to new developments in the Artificial Limb Program. *Artificial Limbs* has a regular distribution of more than 4,000, and it goes to just about every country in the world. The journal is now a joint undertaking of CPRD and the Committee on Prosthetic-Orthotic Education. Future issues of *Artificial Limbs* will contain articles on orthotics as well as prosthetics.

There is a considerable volume of orthotics research currently being sponsored. Practically all of the traditional prosthetics research groups have some orthotics research going on, and there are some additional laboratories doing very creditable basic and device research. Many of these items need current evaluation. It is believed that this may be accomplished in the near future.

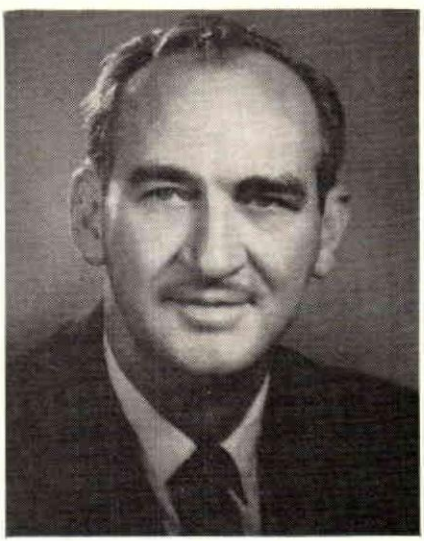
I hope this has not been too rambling or too discursive a survey of our fields of mutual interest. I have tried to say that as a surgeon it is my belief that you as prosthetists and orthotists are entering a new and challenging era. Some of your old problems are becoming less pressing and may disappear—but you are faced by many new and more difficult ones that will be equally challenging and rewarding to solve. As one interested in prosthetics and orthotics education, I have attempted to encourage you to support education and be patient with the growing pains of our newcomer: orthotics education. Remember, one can't teach something one doesn't understand. As our knowledge increases, our ability to transmit that knowledge will keep pace. As Chairman of CPRD, I have tried to indicate the Committee's continuing focus on the end product of research and development: improved patient care.

Personally I would like to take this opportunity to congratulate you members of AOPA on the tremendous efforts that you have exerted in the development and continuation of this multi-faceted program. Many of you have given generously of your time and substance serving on committees, attending meetings, working on new techniques, attending schools and willingly doing research-type fittings in order to make some of these dreams realities. You have been one group of the pioneers in the development of the interdisciplinary "team" approach to the solution of medical problems.

Do not rest on your laurels. Much remains to be done. You who know the needs and the inadequacies must enter into the plans of needed research and development. Some day your growing association may well develop your own non-profit research program so that you may more directly focus one aspect of clinical feedback on prosthetics and orthotics research.

W. B. SWAYZE NEW VR DIRECTOR FOR LOUISIANA

W. B. Swayze, former Assistant Director, has recently been appointed Director of Vocational Rehabilitation for Louisiana. He succeeds the late Mr. Seid W. Hendrix who had been Director for a number of years.



Writing to Mr. Swayze to congratulate him on his appointment, AOPA Executive Director Lester Smith stated, "Vocational Rehabilitation in Louisiana has set high standards and encouraged members of this Association to pursue advanced training and offered the best in service to their patients. Since you were Assistant Director during the administration of Mr. Hendrix it is good to know that this tradition of excellence in Louisiana is to be continued."

The Association joins Mr. Smith in offering warm congratulations to Mr. Swayze.