

The Educational Program for Prosthetists and Orthotists: Further Progress Made Toward The Goal of Professional Standing

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The Education Program of our industry made a major step forward in October 1952, when the Federal Bureau of Apprenticeship approved the new "Apprenticeship Standards for Prosthetists and Orthotists." This article reports the efforts which led to this development, and describes the steps which remain to be taken before our hoped-for goal of professional standing is realized.

The Apprenticeship Standards for Prosthetists and Orthotists include the "Schedules of Work Processes," or on-the-job training outlines developed by the OALMA Education Committee, the related academic courses selected by the Advisory Committee on Educational Standards of the American Board for Certification, and various other requirements for apprentice standards, such as wages, supervision, and records. These standards, which were developed with the assistance of Mr. Carl B. Madson of the Bureau of Apprenticeship, had been presented in August 1952 to the Federal Bureau of Apprenticeship, of the U. S. Department of Labor, which has jurisdiction over National Apprenticeship Standards.

The need for an Education Program to improve the proficiency of persons in the industry and to train others had been recognized for many years. A great deal of effort and thinking has been devoted to this need. For example, in 1943 the directors of the Association of Limb

Manufacturers of America, whose President was then Chester C. Haddan of Denver, prepared an outline of a training program for disabled veterans of World War II. Atha Thomas, M.D., Assistant Professor of Orthopedic Surgery, University of Colorado School of Medicine, and Mr. Lee Dodge, State Supervisor of Apprenticeship Training, Denver, Colorado, give valuable assistance in preparing this outline. This program was to include on-the-job training in Orthopedic Braces and Artificial Limbs and also selected courses of study in medical schools.

In 1944, a special committee of the Association of Limb Manufacturers of America prepared an Apprenticeship Program as a further development of the 1943 program, covering both veterans and non-veterans, to cover apprenticeship training on the job, together with related academic studies.

The system of developing trained limb- and brace-makers and -fitters by apprenticeship has been in use for many years. These skills were taught by actual supervised experience. In many cases, this experience was specialized or limited rather than well-rounded experience. Many sons of limb- or brace-makers came into the field under the supervision of their fathers, and this situation still continues.

While the need for related academic training had been recognized for years, no concerted effort was made to establish actual classes or courses in suitable subjects until an apprenticeship school was set up by members of the industry in the Los Angeles area in 1947. They set up a Trade Advisory Committee which established Apprenticeship Training Standards, and a School to supplement the on-the-job training. Through the cooperation of the Los Angeles Board of Education, a three hour class, one night a week was set up with J. J. Vollmer as instructor. This class continued until 1951 when the permanent Education Committee was established with Harvey G. Lanham as Chairman. The school program is still being run successfully in Los Angeles. They hold classes for 24 weeks each year in anatomy, physiology, orthopedic surgery, and other subjects. All the members of the industry in this area are due a great deal of credit for establishing and continuing this training program, which was a true pioneer effort.

The 1944 Plan

It is interesting to note that in the 1944 proposed program, our Association recognized that apprentices in this field should receive 144 hours of related instruction for each year of apprenticeship, in conformity with the accepted Federal Standards for Apprenticeable Occupations. Furthermore, it was agreed that four years of on-the-job experience was necessary to develop an untrained apprentice into a "mechanic" of acceptable competence. Finally, this report recommended a plan for awarding certificates to "mechanics," who completed the training or otherwise qualified under standards to be approved by the association. The committee report stated, "Such a plan for Certified Technicians or Mechanics, and possibly for Certified Artificial Limb and Appliance Shops, operating under standards recognized by the industry could be used in building

confidence and good will on the part of the public and the Orthopedic Surgeons toward those shops which adhere to such standards." In other words, here was one of the early steps leading to the Certification Program.

After the American Board for Certification of the Prosthetic and Orthopedic Appliance Industry was established, one of its first projects was the establishment of an improved Education Program. In 1949, the Board requested Dr. George H. Young, Assistant Director of the Mellon Institute of Industrial Research in Pittsburgh, to establish a committee to advise the Board on educational standards for the training of those who wish to become Certified Prosthetists and Orthotists. It was to make any other recommendations it saw fit on the educational needs of the industry.

The committee was established on October 28, 1949. Members are: Dr. George H. Young, *Chairman*; Dr. Harold E. Weaver, Senior Fellow at Mellon Institute, *Secretary*; Mr. W. L. Cooper, Area Coordinator of Trade and Industrial Education, Department of Public Instruction, The Commonwealth of Pennsylvania, of Pittsburgh; Dr. Ward Darley, Dean, Department of Medicine, University of Colorado Medical Center, Denver; Professor K. L. Holderman, Director of Engineering Extension, Pennsylvania State College, State College, Pennsylvania; Dr. C. P. Scott, Associate Professor of Vocational Education, University of Pittsburgh at Pittsburgh; and Mr. R. H. Wilson, Director of Apprenticeship, Department of Labor and Industry, Commonwealth of Virginia at Richmond.

This committee was divided into these four subcommittees:

Subcommittee 1—To set standards for Apprenticeship Programs.

Subcommittee 2—To survey by questionnaire the thinking of the industry on its educational needs.

Subcommittee 3—To establish the requirements of a formal college level training program.

Subcommittee 4—To study and recommend extension type courses applicable to our industry.

The Questionnaire Subcommittee (No. 2) has completed its work, which was used to guide the work of the other committees.

The Subcommittee on college level training (No. 3) is still working on its program. It has made certain general recommendations, however. Members of the committee feel that the student in this course should have a three year basic program in an accredited engineering school, in mechanical engineering or equivalent, followed by a two year special course of study in a medical school. The last year should be followed by or paralleled by supervised training in an approved limb or brace shop. The need for this type of trained personnel is important, but it may be quite limited.

The Subcommittee on extension work (No. 4) has done certain preliminary investigation, but is awaiting further development of the other programs before proceeding.

The recommendations for Apprenticeship Programs were considered by the Advisory Committee to be in final form as far as educational standards were concerned, and they

were presented to the American Board for Certification (along with a report on the status of the remaining part of the committee's work) on March 3, 1951.

First, the Committee recommended that the minimum standard for training persons who wished to stand for examination as a Certified Prosthetist or Certified Orthotist should conform to the general pattern laid down by the Federal Committee on Apprenticeship. In other words, they re-examined and confirmed the conclusions previously reached by leading members of our Association, that our skilled craftsmen should have an apprenticeship of at least four years in duration, which should include related academic instruction of 144 hours per year.

Secondly, the committee pointed out the real heart of the Apprenticeship problem; "Training in the making and fitting of orthopedic devices and prostheses cannot and must not be compared directly with apprenticeships in other mechanical arts such as masonry, plumbing, carpentry, powered machinery operation, et-cetera. The difference is not a specious nor a philosophical one. Craftsmen in this field deal directly with a most vulnerable segment of the country's population, namely, the

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McCarthy Hanger, Jr., though still a young man, has had 15 years' experience in the artificial limb field. After graduating from Duke University and taking a Master's degree in Business Administration from the University of Pennsylvania, he began work with J. E. Hanger, Inc. at Philadelphia in 1938. During World War II, Mr. Hanger was an officer in the U. S. Naval Reserve. After the war, he moved to St. Louis to become Vice President of J. E. Hanger of Missouri, Inc. He was elected president of the company following the death of his father, McCarthy Hanger, Sr., in September, 1949.



"Why Train an Apprentice?"

The need for additional skilled fitters has become more and more obvious. This need was expressed in the early days of World War II and has steadily become more acute. Dr. Miles Anderson, speaking in terms of general skilled trades, has stated that the average working life of skilled workers is twenty-eight years. This means that replacements must be obtained at a rate of 3.6 per cent each year, to maintain a sufficient supply of skilled craftsmen. Since we have in the neighborhood of 1,000 Certified Prosthetists and Orthotists, this means that we must put into training approximately fifty apprentice fitters every year, so as to allow for the number who drop out.

If we are to put into training fifty apprentices each year, then at any given time we should have about 175 to 200 apprentices in various stages of training. In

other words, one half to two thirds of the recognized and certified limb facilities should have an apprentice in training.

While the need for these apprentices is obvious, the decision for any one firm to have an apprentice in the training program is up to the manager of the individual firm. Also, each individual firm must face squarely the fact that, if it is a one-man firm, which either wishes to expand its service to its patients, or wants to avoid decreasing that service as the owner becomes older and less active, then it needs an apprentice. Any firm larger than a one-man firm is subject to turnover and loss of its personnel. To safeguard its service against this contingency, such a firm needs an apprentice. *It is a necessary cost of doing business to train apprentices, just as necessary as paying rent.*

lame, the injured, the handicapped persons. The results of bad workmanship, or unethical or ignorant practices, have far wider humanitarian consequences than can be true of any other craft. Thus, the working orthotist or prosthetist much more nearly resembles the trained practicing nurse, the clinical laboratory technician, the medical corpsman, than he does the journeyman electrician, skilled mechanic, or building craftsman; and this despite the fact that he is basically a *fabricator of a special device or appliance.*"

Therefore, the Advisory Committee recommended that special emphasis be given to on-the-job training in limb and brace shops designated and approved by the Association to offer such training. The training centers

must be subjected to investigation, selection, and a salutary measure of control, preferably through our own industry organizations, voluntarily and eagerly working with the various State and Federal Vocational Educational Bureaus. Finally, the recommendations of the Advisory Committee as to length and type of apprenticeship, and the related academic courses, were to be considered a basic foundation, a minimum which must be given to apprentices. They recommended more lengthy training be considered as a goal, to be established as it became practical and possible in future years.

In the closing days of his term as President of OALMA in 1950, Mr. Daniel A. McKeever had appointed an Education Committee of the

OALMA, consisting of McCarthy Hanger, Jr., of St. Louis, *Chairman*; Lee Fawver of Kansas City (now President of OALMA), and Herman C. Hittenberger of San Francisco. The function of this committee was to put into operation a program which would meet the standards developed by the Advisory Committee on Educational Standards for the American Board for Certification.

This committee met with Dr. Young's committee and examined his report on Educational Standards and concurred in his findings, stating its belief that the Standards were capable of attainment. Therefore, as soon as the American Board for Certification accepted the Standards for Apprenticeship Programs, the OALMA Education Committee was ready to proceed to put its principles into effect.

Four Years Training for Fitting

At the Meeting of the American Board for Certification at which the Educational Standards were accepted and approved, it was agreed that the four year training program would be considered adequate for training only in the *fitting* of artificial legs (not including arms) or orthopedic braces. Such training would include enough of the essentials of leg *making* or brace *making* to enable the fitter to perform the function of fitting satisfactorily, but would not permit an apprentice to become an expert leg maker *and* fitter or an expert orthopedic mechanic *and* fitter. It was agreed that an apprentice in a shop which makes both limbs and braces could complete apprenticeship programs in both leg and brace fitting in a total of five years, because of the many skills which are common to both types of work. The problem of training in artificial arm fitting was to be given further study.

To carry out these principles, the outline of on-the-job training, or *Schedule of Work Processes for an Apprentice Prosthetist* requires the

equivalent of about two years of training in the mechanical processes of artificial leg making and two years of leg fitting. The *Schedule of Work Processes for an Apprentice Orthotist* requires about two and a half years of training in the mechanics of brace making, one and a half years of fitting. The *Schedule of Work Processes for an Apprentice Prosthetist-and-Orthotist* requires about three years of training in mechanics and two years of fitting legs and braces.

As to the qualifications of the shops in which apprentices ought to be trained, it was agreed that such standards should correspond to the standards set for certified shops or facilities.

Mr. Lee Fawver developed the *Schedule of Work Processes for a Prosthetist*. Mr. Herman C. Hittenberger developed the *Schedule of Work Processes for an Orthotist*. Then Mr. Fawver completed the very exacting task of combining these two programs to form the Program for the Apprentice Prosthetist-and-Orthotist.

Both of these men have had many years of practical experience in the industry. Their accomplishments are too well known to require further description here. In developing these programs, they studied and used the best points from many different on-the-job training programs, which have been in actual use in limb and brace shops.

After these programs were initially developed, they were reviewed intensively by the entire committee and also by Chester C. Haddan, Lucius Trautman, and Howard Thranhardt, leading members of the OALMA, who are also the Industry Advisory Committee to the government research program.

These on-the-job programs or schedules of work processes, therefore are the result of years of development and are now considered to be the National Standard. However, their purpose is not to set up an artificial,

TABLE I.

<i>Course</i>	<i>Total Hours</i>
Functional Anatomy for Orthopedic Trainees (Including Normal and Abnormal)	144
Sketching and Plan Reading, Pattern Making and Principles of Alignment	36
Welding (Including Brazing and Silver Soldering)	36
Heat Treating and Forging	36
Elementary Mechanics and Mathematics (Including Strengths of Materials)	36
Applied or Business Psychology	36
Elements of Cost Accounting	36
Plastics	18
Leather and Textiles	18
Ethics of the Trade	18
Public Speaking	36
Gait and Posture Training	18
Techniques of Physical Therapy and Rehabilitation	18
Tool Care and Usage	18
Business English	36
Sketching and Drawing: the Human Form	18
Business Economics	18
Total Hours in Course	576

rigid, or arbitrary schedule, which must be followed to the letter in the training of every apprentice fitter. Their purpose is to set forth a well-rounded program which can be used flexibly enough in any shop or facility to make apprentice training practical and thorough. For example, due to variations in work loads, no matter what the size of the shop, an apprentice cannot be started at a certain point of training and trained in an ideal succession of processes straight through his entire program, without skipping around among the various processes. Nor can he adhere rigidly to a schedule of a set number of hours for each process. However, by using the hourly schedule set forth in the work schedule as a guide, and by keeping track of the amount of time spent on the various processes, it can be determined whether the apprentice is being given a well-rounded and thorough training.

A system of reports and records has been developed to record the progress of Apprentice Prosthetists and Orthotists, and is being tested in

the New York and Minneapolis Pilot Schools. When this system has been perfected, it will be used for all apprentices being trained under the National Apprenticeship Program.

The Advisory Committee on Educational Standards gave a great deal of thought to the related academic training. They recommended courses with an approximate number of hours for each course, as listed above in Table I. Such courses are to be superimposed on a high school level of education or its equivalent.

Certain of these courses such as Welding, cover shop practices, and are designed to teach the apprentice thoroughly some of the techniques he will be called on to use in his mechanical work. Other courses, such as Functional Anatomy, are designed to give him a more thorough professional background. Other courses, such as Public Speaking and Business English, will round out his general education with subjects which are particularly useful in contacts with patients, and will increase the apprentice's confidence in himself.

Business Economics and Cost Accounting are included to give a knowledge and appreciation of the economic factors in our service to the handicapped.

Some of these courses are readily available in local adult night classes in the high schools or in trade schools. Some of them would be suitable for use in those schools with a little alteration or guidance from our craft as to just what was necessary for our apprentices. However, seven of the courses are entirely unique to our craft, or the subject matter as commonly given is not applicable to our craft. The problem arose as to how to teach those courses.

There would be very few cities in the United States where a class of apprentices could be gotten together, which would be large enough to warrant engaging a teacher in special classes or to obtain classrooms and assistance from the local public schools. While the public schools are interested in apprentice training and are willing to assist, they require a minimum number of students ranging from eight to twenty. Although the OALMA Education Committee is willing to assist in setting up such special classes wherever the minimum requirements of the schools can be met, it is obvious that the great majority of our apprentices will have to be taught by some other method.

The solution now being developed is one of several alternatives which were considered by the OALMA Education Committee. It is developing lessons in the special courses in "Unit Lesson" form, similar to a correspondence course, which can be used by the isolated apprentices to study the required courses. Such apprentices can, with the assistance of their employer, enlist the aid of an interested local surgeon, high school teacher, or some other qualified person, to solve the most difficult problems in his studies, learning as best he can outside of his working hours, just as do students of many well known cor-

respondence courses. This method of teaching has received more and more approval as a practical method of learning in the last few years, and has a much greater standing than formerly, due largely to the increase in the number of courses set up on an extension basis by colleges throughout the country. Periodic examinations will be given to these apprentices to determine the extent of their progress in learning.

To obtain basic material for the Unit Lessons, pilot schools have been set up in New York and Minneapolis, to teach these subjects to local apprentices. A "Teacher-Trainer" is working with these classes to take notes on the lectures and organize them in lesson form. These notes will be edited and elaborated on and illustrations will be provided, along with related outside reading, to make it possible for the apprentice to study at home.

The Pilot School at Minneapolis held its first class on October 14, 1952, and the New York School started classes on February 3, 1953. The members of OALMA in both New York and Minneapolis have given the pilot schools their enthusiastic support, and the response among fitters and apprentices has been excellent. Many obstacles had to be overcome to bring these pilot schools into being. Many more obstacles must be faced and overcome in keeping them in operation. While many people have contributed to the progress of the schools, special credit must be given to Mrs. Adele Tenenbaum and Mr. Robert C. Gruman, the Chairmen of the local Education Committees in New York and Minneapolis respectively, and to their committees.

It is not considered feasible to require that apprentices generally in cities outside of New York and Minneapolis start taking the related academic courses until the special courses listed above are well on their way to final development. While this means a delay in the academic training of these apprentices, it is felt that once the

apprentice starts his academic training, it should be continuous until the end of his training program. Therefore, at the earliest practical point, an announcement will be made concerning the starting of the required courses.

The American Board for Certification plans gradually to increase the scope and difficulty of its examinations for Certified Prosthetists and Orthotists, timing this gradual increase to be coordinated with the introduction of the related academic courses among apprentices generally.

In other words, if it may be estimated that apprentices can be expected to start their required academic training throughout the country by January 1955, then by 1959 all apprentices completing their training will have taken the entire set of required academic courses and will have been trained in accordance with the on-the-job training outlines set forth in the Apprenticeship Standards. The examination for certification at that time will be based on the level of difficulty corresponding to this required training. Apprentice Prosthetists and Orthotists who are part way through their training when the required academic training is available will be given credit for all of their training to date, which is applicable to the standard program, and will be required to complete their program

of on-the-job training in accordance with the Apprenticeship Standards.

The progress made and the decisions reached by the OALMA Education Committee have been reviewed periodically by and have met the approval of the officers of the OALMA and the American Board for Certification.

It is beneficial that different approaches to education be tested and the results be used to improve our overall education program. Therefore, due recognition should be given not only to the pioneer work in the Los Angeles area, but also to other educational efforts. Firm owners and key personnel in the San Francisco area have started an experimental school to test the value of various subjects and to develop courses for later use by apprentices. The Suction Socket Schools, of course, are an educational effort which has advanced substantially the standing and technical ability of the Prosthetic Appliance field. The Mellon Institute Symposia on Orthopedic Appliances under the auspices of the Sarah Mellon Scaife Foundation were acclaimed by everyone connected with them as an outstanding contribution to orthopedic appliance techniques. Lastly, we owe much gratitude to all concerned in the establishment of the schools in plastic arm fabrication, fitting and harnessing now underway at the University of California in Los Angeles.

“What’s New(s)”

• **JERRY LEAVY** has resigned his position at the University of California to become associated with the Hosmer Corporation at San Jose, California. In his new work, he will visit as many limb shops as possible and advise about the practical problems involved in prosthetic devices. While at UCLA, he was in charge of prosthetic training in the case study program.

• **MEDICAL FABRICS CO., INC.**, a prominent manufacturer of Elastic

Bandages, has added to its line Plaster-of-Paris Bandages. This combination of Elastic Bandages and Plaster-of-Paris Bandages, obtainable from one source, is available to all limb dealers. A report on the preparation of amputation stumps with this combination pressure bandage has been prepared by Dr. Ludwig Popp of New York City. It may be borrowed from OALMA Headquarters. Medical Fabrics Co., Inc. has joined our list of advertisers and its first ad appears in the center fold of this issue.