

Professional Education—A Nine-Year Report

Prosthetics from Classroom to Clinic



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Let us suppose that a revolutionary development in prosthetics should be perfected tomorrow that would make it possible to fasten a pylon into the bone in an amputee's stump, then fashion a light and serviceable prosthesis around the pylon, producing an artificial limb that would very closely resemble a restoration of the patient's lost limb, in appearance, function, and comfort. The techniques for fabricating and fitting this new prosthesis would be entirely different from anything that had ever been done before. What would be the best way to make this greatly improved prosthesis available to the amputees who could benefit from it?

The problem faced by the Veterans Administration in 1952 was comparable to the one described in the preceding paragraph. They had spent millions of dollars on research to develop better artificial arms, and the arms were now available. but how could they get them to the veteran amputees who needed them? Various means of communication were used, such as distribution of research reports and brochures, articles in professional journals, demonstrations at scientific assemblies, and the like, with little or no results. The techniques and knowledge needed to successfully fabricate and fit these new arms of plastic, with their strange harnessing and power transmission systems, were too complex to be mastered by merely reading a

report or seeing a demonstration. The prosthetists could not afford to experiment, as the risk of failure was too great. The doctors with whom they worked knew nothing about these new prostheses, and so could not prescribe them even if they could be made available. There were no therapists who knew anything about training amputees to use these new prostheses. Many hundreds of veterans who had lost their arms in the war were either doing the best they could without prostheses, or were getting by with ineffective make-shifts.

The Veterans Administration and the Advisory Committee on Artificial Limbs of the National Research Council saw by 1952 that drastic action would have to be taken to make better artificial arms available for the veterans. They decided that the answer was an educational program in which a school would be organized for the purpose of teaching the prosthetists, therapists, and physicians how to fit the new type arms, and how to train the amputees in their use. The upper extremities prosthetics research that had produced the improvements in artificial arms had been largely centered at the University of California at Los Angeles, so this institution was asked to set up the first prosthetics school.

The first prosthetics education program was a joint effort of the College of Engineering and the School of Medicine at U.C.L.A. The Medical Center was still an excavation and a mass of blueprints, so Engineering loaned part of their Mechanics Building Annex to house the new school. The Veterans Administration provided funds for materials and equipment, a staff was organized, a training plan formulated, manuals and lesson sheets prepared, and teachers trained. By January 1, 1953, the new prosthetics school was ready for its first class.

The primary mission of the school was to train a prosthetic clinic team for each of some thirty Veterans Administration Regional Offices in that many cities in various parts of the country. The clinic team idea had been tried in the San Francisco Regional Office, where it had been found that the joint efforts of the physician, therapist, and prosthetist were indispensable in providing efficient prosthetic service. To accomplish this, the educational program was organized so the prosthetists were in attendance for six weeks, the therapists were in class for the last three weeks of the six, and the physicians attended the last week of the six. During the last week, the three groups worked together as clinic teams, practicing prescription, check-out, and training. This experiment in team education of diverse professional groups, the members of which had in many instances very little relation with one another in the past, proved to be one of the most interesting aspects of the program, and one which encouraged other groups on the U.C.L.A. campus to attempt similar programs.

Twelve six-weeks schools were completed in quick succession between January 1953 and February 1955. A total of 120 prosthetists, 155 therapists, and 184 physicians completed their respective courses. Prosthetic clinic service was established in 46 cities; of these clinics 28 were for Veterans Administration personnel, 6 for the military, and 81 for rehabilitation facilities for the general public. The impact of this educational program on the amount and quality of upper extremities prosthetics service in the United States was felt almost immediately. The relative improvement was estimated by Veterans Administration officials to be at least on the order of 50%. The new type artificial arms were made and fitted for veterans as rapidly as they could be brought in to the centers and processed through the clinic

procedures of prescribing, fitting, checking out, and training. In addition, the clinic personnel trained to give service to the general public were rapidly fitting the victims of industrial and agricultural accidents, as well as congenital and other types of amputees, with the new prostheses. Vocational rehabilitation agencies were quick to take advantage of the availability of more efficient artificial arms in the vocational rehabilitation of arm amputees, resulting in more placements of these handicapped people on productive jobs. A good case could be made for the assertion that the cost of the education research programs in upper extremities prosthetics was paid for many times over through income taxes collected from arm amputees made employable by the improved prostheses, and the savings in funds paid for their support when unemployed.



Clinic team checks out Mr. J. P. Mountain, age 78, bilateral wearer of patella tendon bearing below knee prostheses. Class in below knee prosthetics, U.C.L.A. Prosthetics Education Program.



Alex Frazer, bilateral AK amputee, demonstrates his ability to negotiate the ramp wearing two Hydra-Cadence AK Prostheses.

This experience provides the answer to the imaginary situation described in the opening paragraph. There can be little doubt in the minds of those who have followed the progress of the prosthetics education program through the years that if a revolutionary new method of fitting a lower extremity prosthesis directly to the amputated bone is developed, the most efficient way to get this improvement to the amputee is through the prosthetics schools.

While the prosthetics education program was almost entirely supported with funds by the Veterans Administration and certainly no child amputees could be found who would qualify as veterans of our armed forces, none the less it was felt that advantage should be taken of every opportunity to learn everything possible about the problems of fitting arm prostheses for children. Before the start of the first schools, the prosthetics education director and chairman of the Department of Pediatrics of the U.C.L.A. Medical School met and discussed a program in which the school would fit children sent by pediatrics, with the latter responsible for medical care, and follow-up a joint responsibility of both groups. As a result of this arrangement, children were included as clinical subjects in each school, and were fitted with artificial arms by the students. This was the start of the

Child Amputee Prosthetics Project at U.C.L.A., now a separate project in the Medical School, operated jointly by the Department of Pediatrics and Surgery (Orthopedics). During the twelve upper extremities prosthetics classes, a total of 51 children were fitted with artificial arms, and much was learned about the prosthetic, medical, and psychological problems of the child amputee.

When the twelfth "arm school" was completed, a study was made of the data on the application forms of the 120 prosthetists who had attended the classes, with the idea that some clues might be found that would serve as a guide to the planning of future educational programs for prosthetists and orthotists. The students were a comparatively young group, 80% being under 45 years of age. While certification was relatively new, 75% of the students were certifees. Their years of experience in prosthetics ranged from 1 to 30 years, with the actual distribution as follows:

<i>Years Experience</i>	<i>Number</i>
1-5	20
6-10	30
11-15	14
16-20	23
21-25	9
over 25	7
no data	17

The amount of formal education reported by the enrollees ranged from elementary school only, to university graduate work. The numbers in each category were as follows:

<i>Educational Level</i>	<i>Number</i>
Elementary school	4
Some high school	16
High school graduate	42
Some college	24
College graduate	15
Graduate work	2
No report	17

Such a wide range of educational background is typical of occupations which have no professional standards, no enforceable educational requirements for entrance, and no professional educational program or schools. Test results revealed another lack always found among those in occupations that have no educational standards, an almost universal weakness in scientific and technical knowledge, such as anatomy, kinesiology, and mechanics. This information proved conclusively the need for a program of college level professional education to provide prosthetists who meet or surpass minimum standards of technical competence.

The U.C.L.A. Prosthetics Education Program from its inception has always enjoyed good relations with the prosthetists' professional organizations, the Orthopedic Appliance and Limb Manufacturers' Association (now the American Orthotics and Prosthetics Association), and the American Board for Certification of the Prosthetic and Orthopedic Appliance Industry. The latter group is responsible for preparing and administering tests to candidates for certification to determine their competence as prosthetists and orthotists. In early 1954 they requested the U.C.L.A. Prosthetics Education Program to give technical assistance in the development of a battery of written and performance tests to cover all aspects of both prosthetics and orthotics. This was done, and in September of that year the first of these tests was given in Philadelphia. During the succeeding years the tests were

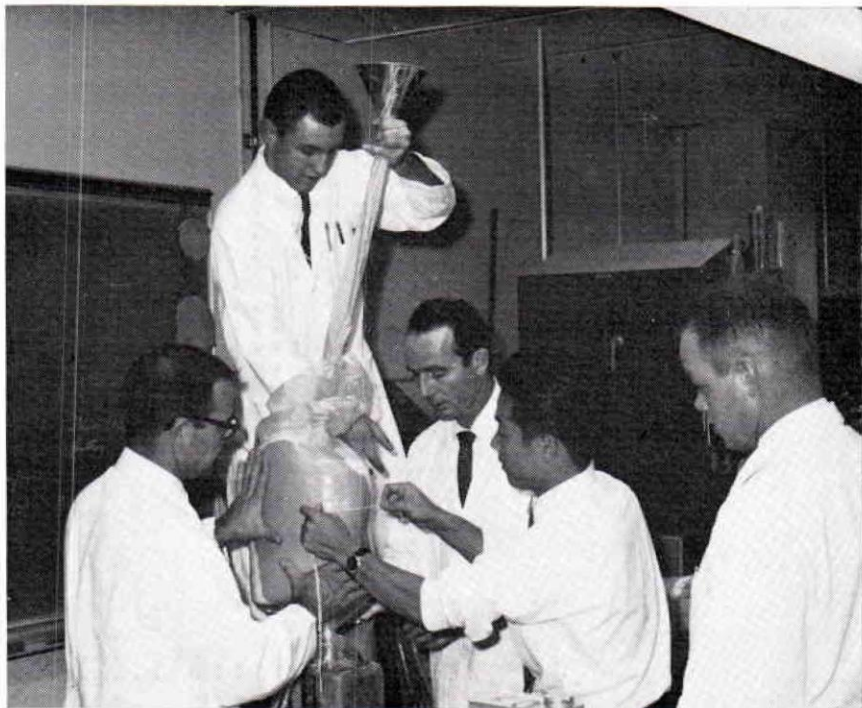
refined and expanded at U.C.L.A. under the supervision of a member of the staff to whom this responsibility was assigned. By 1959 this work had almost become a full-time job, and the U.C.L.A. staff member who was in charge of the testing program accepted the position of Executive Director of the American Board for Certification in Washington, D. C. The certification testing program of the A.B.C. has been acknowledged by authorities to be one of the most effective ever developed for any professional group.

When the first plans were made for the Prosthetics Education Program at U.C.L.A. it was understood that when the twelve schools in Upper Extremities Prosthetics were completed, and the clinic teams for the Veterans Administration were trained, the program was to be disbanded, its mission accomplished. However, just as the last of the "arm schools" was completed, there was a demand for a similar educational program in Above Knee Prosthetics. A greatly improved suction socket above-knee prosthesis had been developed in the research program at the University of California in Berkeley, and it was felt that only through a series of schools similar to those in Upper Extremities Prosthetics could the skill and knowledge needed to fit these improved limbs be disseminated so that amputees could benefit from them. Instead of disbanding, early in 1955 the staff of the Prosthetics Education Program went to work on the development of an education program for prosthetists, therapists, and physicians in Above Knee Prosthetics. Many weeks were spent in preparing a Manual of Above Knee Prosthetics, various teaching aids, and films. The University of California at Berkeley gave a "Pilot School" in August, 1955, and the program was well on its way toward realization. It was not possible to start the first class until early in 1956, because the Medical Center had been completed, and the Prosthetics Education Program had been given a generous allocation of space in the new building. The time required to finish the space, purchase and install new equipment, and move from Engineering to the Medical Center made it necessary to postpone start of the Above Knee Prosthetics program until May, 1956. Since that date, thirteen additional courses have been given, training a total of 147 prosthetists, 186 therapists, and 204 physicians in the team approach to prosthetic service for above-knee amputees.

Within a year, experience in fitting several hundred amputees in the above knee prosthetics classes revealed a number of serious deficiencies in the procedures being taught. For example, no specific method for designing a socket to accommodate varying amounts of hip flexion contractures had ever been devised, and it became very clear that such a procedure was essential if serious contracture cases were to be fitted properly. There were no precise standards of stump-socket dimensional relationships, without which it was impossible to know whether a socket was right or wrong, a condition unacceptable in a teaching situation. It became apparent that the accepted rule of always making the medial socket wall vertical was responsible for trouble in a number of cases, and the trouble was traced to failure to adapt to abduction contractures. A means had to be devised for measuring such contractures, and for changing the socket design to accommodate them. Experience with the adjustable leg soon proved that it could not be used as a cure-all for alignment problems, because making very radical adjustments with it also made unacceptable changes in the socket angles, particularly the relationship of the ischial seat to the floor. These and other serious problems had to be solved immediately, and this the teaching staff undertook to do. Accurate records of all aspects of every case fitted had been kept, and these were carefully analyzed for clues to answers to the problems. New procedures were worked out, new standards established, more shaping and

alignment factors were made subject to accurate measurement. As a result, socket-stump tension analysis, flexion-abduction contracture analysis, and socket shaping and fitting procedures were so perfected that the correct socket design and alignment for each amputee could be planned in advance and carried out with more assurance than ever before that the prosthesis would function correctly. Teaching was improved greatly by the ability of the instructors to check each student's work with precision methods, practically eliminating the "art" and guesswork that had been so commonplace before. Careful application of the principles developed made it almost completely unnecessary to make any changes in the adjustments of the adjustable leg after it had been set up in static alignment. The use of the "tilt screws" and other adjustments on the adjustable legs was completely eliminated in dynamic alignment.

The development of these improvements in above knee prosthetics made it necessary to conduct a series of courses in Advanced Above Knee Prosthetics, in which prosthetists who had previously taken the Above Knee Prosthetics course were brought back for a one week intensive session of instruction in the new principles and techniques. Since the new Hydra-Cadence hydraulic unit for above knee prostheses had been approved and made commercially available, the techniques for installing and adjusting it were included in the course. Thirteen classes were given between 1958 and 1961, for a total of 123 prosthetists. Since the advanced material has now been incorporated into the regular course, the advanced course will not be continued.



U.C.L.A. prosthetics instructors demonstrate lamination of Canadian Hip prosthesis socket for Dr. Sieshi Sawamura, from Kobe Medical School in Japan. An orthopedic surgeon, Dr. Sawamura spent six months at U.C.L.A. studying prosthetics and orthotics.

In response to a demand for research to improve below knee prosthetics, the University of California at Berkeley in April, 1957, held a four day symposium on the subject, attended by prosthetists who were thought to be representative of the best practice in the field throughout the country. The ideas and suggestions brought out in this meeting led to the development of the patella tendon bearing cuff suspension below knee prosthesis. After appropriate "pilot schools" a new course in this field was started in 1959. To date, nine classes have been given, for a total of 113 prosthetists, 117 therapists, and 165 physicians. A survey made in the spring of 1960 indicated that the new prosthesis was very successful, the chief problems being encountered in hot, humid climates where the soft sponge rubber liner created perspiration difficulties.

While the educational program had been of help to the prosthetists, the orthotists had not benefited at all, as no courses had been prepared for their particular needs in the field of bracing. It was felt at U.C.L.A. that the problems of the paralytic were as important as those of the amputee, and that if improved braces could be made available to help them, the orthotists who make and fit them, the physicians who prescribe them, and the therapists who teach the patient to use them, all should be trained to work together as clinic teams, just as had been done for prosthetics. Important advances had been made in functional bracing of the upper extremities in Southern California at Rancho Los Amigos Hospital, and by Dr. Edwin Schottstaedt and George Robinson, C.P., in Northern California. In November, 1957, a meeting was held with the two groups, and agreement reached on the development of a training program in upper extremities bracing. An instruction manual had to be prepared, and teaching aids developed, "pilot classes" for instructors given, and a combined course for orthotists, therapists, and physicians planned. The first class was given in September, 1958, followed by seven more, with total enrollments of 97 orthotists, 123 therapists, and 162 physicians. As a result of these classes, many victims of paralysis of the upper extremities have been rehabilitated by being fitted with hand splints and functional arm braces that enabled them to get their paralyzed hands and arms back into operation once more. "Outside power" was introduced for the first time in the form of the carbon dioxide driven artificial muscle, developed at Rancho Los Amigos. The application and use of outside power for flexor hinge splints and functional arm braces has been taught at U.C.L.A. for the past two years, with considerable success.

Earlier it was mentioned that the original Prosthetics Education Program had been sponsored by the Veterans Administration. Since the scope of the program had broadened as it progressed, the officials of the Veterans Administration felt that it would be more appropriate for an agency with broader responsibility for rehabilitation of the handicapped population to take responsibility for the program. In September, 1956, the U.S. Office of Vocational Rehabilitation took over the sponsorship of the Prosthetics Education Program. Subsequently, in conferences with O.V.R. representatives, the idea of a short orientation course in prosthetics and orthotics for vocational rehabilitation counselors was suggested. Since these counselors are responsible for the management of many clients who are amputees, it would be to their advantage to know about the possibilities and limitations of the new prosthetic and orthotic devices now available.

A short, intensive five-day seminar was planned and given a trial at a "pilot school." After pruning unnecessary material and reorganizing the remainder, the course was streamlined to a three-day seminar that accomplished its purpose quite satisfactorily. Since starting the program in 1957,

Total Enrollments, UCLA Prosthetics Education Program, Jan. 1, 1953 to June 30, 1961

DATES	PROSTHETISTS									
	U.E.		A.K.		ADV.A.K.		F.B.U.E.		B.K.	
	No. Classes	Enr.	No. Classes	Enr.	No. Classes	Enr.	No. Classes	Enr.	No. Classes	Enr.
1952 1953	4	35								
1953 1954	6	61								
1954 1955	2	24								
1955 1956			1	6						
1956 1957	1	11	6	68						
1957 1958	1	6	3	30	5	38	1	12		
1958 1959	1	13	2	19			4	49		
1959 1960			1	11	5	64	2	24	5	64
1960 1961	1	14	1	13	3	21	1	12	4	49
TOTALS	16	164	14	147	13	123	8	97	9	113

DATES	THERAPISTS									
	U.E.		A.K.		F.B.U.E.		B.K.		O.T.-P.T.-W.S.	
	No. Classes	Enr.	No. Classes	Enr.	No. Classes	Enr.	No. Classes	Enr.	No. Classes	Enr.
1952 1953	4	44								
1953 1954	6	74								
1954 1955	2	37								
1955 1956			1	12						
1956 1957	1	11	6	58						
1957 1958	1	17	3	46	1	10				
1958 1959	1	19	2	28	4	56				
1959 1960			1	21	2	37	5	62		
1960 1961	1	18	1	21	1	20	4	55	1	20
TOTALS	16	220	14	186	8	123	9	117	1	20

Total Enrollments (continued)

DATES	PHYSICIANS								COUNSELORS	
	U.E.		A.K.		F.B.U.E.		B.K.		R.C.C.	
	No. Classes	Enr.	No. Classes	Enr.	No. Classes	Enr.	No. Classes	Enr.	No. Classes	Enr.
1952										
1953	4	47								
1953										
1954	6	85								
1954										
1955	2	52								
1955										
1956			1	19						
1956										
1957	1	20	6	67						
1957										
1958	1	20	3	45	1	10			5	60
1958										
1959	1	23	2	37	4	85			6	68
1959										
1960			1	21	2	41	5	109	3	54
1960										
1961	1	27	1	15	1	26	4	56	4	84
1961										
TOTALS	16	274	14	204	8	162	9	165	18	266

DATES	TOTALS
1952	
1953	126
1953	
1954	220
1954	
1955	113
1955	
1956	37
1956	
1957	235
1957	
1958	294
1958	
1959	397
1959	
1960	508
1960	
1961	451
1961	
TOTALS	2,381

COURSE CODE: U.E., Upper Extremities; A.K., Above Knee Prosthetics; Adv.A.K., Advanced Above Knee Prosthetics; F.B.U.E., Functional Bracing of Upper Extremities; B.K., Below Knee Prosthetics; O.T.-P.T.-W.S., Occupational and Physical Therapist Instructors Workshop; R.C.C., Rehabilitation Counselors Course in Prosthetics.

18 classes have been given, for a total of 226 vocational rehabilitation counselors and other rehabilitation personnel, such as insurance company representatives, rehabilitation nurses, and the like. A similar course is being considered in conferences between representatives of the Bureau of Aid to the Totally Disabled of the California State Department of Social Welfare and the U.C.L.A. Prosthetics Education Program. In this case, the course content would be slanted toward the needs of the social workers in the bureau mentioned.

New programs planned for 1961-1962 are courses for prosthetists in the Canadian Hip Disarticulation and Canadian Symes prostheses, for orthotists in Functional Long Leg Bracing, and a workshop orientation program for faculty members of schools of occupational and physical therapy. The first named program is the result of a "pilot school" given at Northwestern University by the men who originated the Canadian Hip and Canadian Symes prostheses. The U.C.L.A. instructors who attended this class have subsequently organized the material into a concentrated three-week program. The course in Functional Long Leg Bracing is an application of the principles of socket fit and alignment of above-knee prostheses to produce a more functional long leg brace for the paralytic, and will require two weeks.

The workshop for OT-PT school faculty members grew out of a request from the Committee on Prosthetics Education and Information of the National Research Council. Its Ad Hoc Sub-committee on Paramedical Prosthetics Education made a survey which indicated a need on the part of the faculty members of these schools for information and teaching aids on prosthetics and orthotics that they could incorporate into their curricula. It was felt at U.C.L.A. that an advisory committee made up of members of the professional associations of the two groups, authorized to speak for them, should be organized to counsel and advise as to what kind of program was needed, what it should include, how long it should be, and so on. This committee was appointed, and met February 16-17, 1961. They decided on the content to be taught, who was to be invited to attend, and settled all the other questions pertinent to getting this new project under way. The first workshop will be given at U.C.L.A. the last two weeks in June, 1961, for twenty OT-PT school faculty members. The June date was selected so the faculty members would be on vacation, which would avoid conflict with their regular teaching schedule.

Much thought has been given to the problem of offering an undergraduate professional program in prosthetics and orthotics at U.C.L.A. that would lead to the bachelor's degree. That there is a need for such a program is unquestionable, and there can be no doubt that a medical school and hospital environment combined with engineering biotechnology facilities, is essential for such a program to be efficient and realistic. Facilities and provisions for research must also be freely available, and all of these things can only be found in a situation such as that in the U.C.L.A. Medical Center, where prosthetics and orthotics have been a tradition since its establishment. The U.C.L.A. School of Engineering has been noted for its prosthetics research carried on in the Biotechnology Laboratory. The chief obstacle to starting a degree program is the lack of large enough laboratory facilities to provide for both the undergraduate students and the post-graduate or extension students who attend the courses that have been offered for the past nine years. Both programs are very important, but present feeling is that, if the choice had to be made, it would be unwise to give up the extension program to start an undergraduate degree program. The extension program, which improves the skills and knowledge of those already working in the field,



The Paramedical Education Prosthetics Advisory Committee, and U.C.L.A. Prosthetics Education Program consultants. Members of the committee, seated, consultants, standing, left to right. Miss Mary Frances Heermans, O.T.R., Clinical Director, Dept. of Occupational Therapy, University of Illinois, Chicago, Illinois; Miss Dorothy Baethke, R.P.T., Director, Div. of Physical Therapy, University of Pennsylvania, Philadelphia, Pennsylvania; Miss Elizabeth C. Wood, R.P.T., Educational Administrator, Course in Physical Therapy, Northwestern University Medical School, Chicago, Illinois; Miss Margaret Bryce, R.P.T., Assistant Professor, Dept. of Physical Medicine, University of Southern California, Los Angeles, California; Miss Guinevere Wright, O.T.R., Associate Professor, Occupational Therapy, San Jose State College, San Jose, California; Miss Martha E. Schnebly, O.T.R., Associate Director, Courses in Occupational Therapy, Columbia University College of Physicians and Surgeons, New York, New York; Mr. Robert J. Hickok, R.P.T., Clinical Instructor, The Jewish Hospital of St. Louis, St. Louis, Missouri; Miss Caroline G. Thompson, O.T.R., Director, Occupational Therapy, The University of Wisconsin Medical School, Madison, Wisconsin; Mr. Raymond Sollars, Associate Director, Prosthetics Education, U.C.L.A. Medical School, Los Angeles 24, California; Dr. Ralph E. Warden, Chairman, Dept. of Physical Medicine and Rehabilitation, U.C.L.A. Medical School, Los Angeles 24, California; Dr. Miles H. Anderson, Director, Prosthetics Education Program, U.C.L.A. Medical School, Los Angeles 24, California; Dr. Mary Reilly, O.T.R., Director of Occupational Therapy, Neuropsychiatric Institute, U.C.L.A. Medical School, Los Angeles 24, California; Prof. Bernard Strohm, R.P.T., Dept. of Physical Medicine and Rehabilitation, U.C.L.A. Medical School, Los Angeles 24, California; Mr. John J. Bray, C.P. & O., Associate Director, Prosthetics Education Program, U.C.L.A. Medical School, Los Angeles 24, California.

has a more immediate effect in improving prosthetic and orthotic rehabilitation services, and probably gives more aid to rehabilitation per dollar spent, and space occupied, than does any other type. For example, the prosthetics-orthotics laboratory facilities and equipment in the U.C.L.A. Medical Center will have been used for a total of 1,210 hours of organized instruction in 1960-61. An under-graduate program would not use the facilities more than approximately 600 hours during the same two semesters, but would serve to effectively prevent their use by extension students who could not afford to come for short courses consisting of half-days of laboratory work.

Construction of a new building for Physical Rehabilitation at U.C.L.A. has been approved, and in this new building Prosthetics Education will have double the present laboratory facilities. It is felt that in 1963, when this building should be ready for occupancy, it might be possible to have enough space for both an undergraduate and a post-graduate program. In

the meantime, a compromise is going to be tried in the Spring of 1962. The 1961-1962 schedule of extension classes has been so arranged that each of the six different courses to be offered for prosthetists and orthotists will be given in quick succession, with only one or two weeks between each class. A student could start January 8, and complete all six courses on June 29. An attempt is going to be made to enroll individuals who are already college graduates in this six month series of courses. It is planned to give them additional course work in psychology, anatomy, and clinical experience between classes, and to have them work in selected facilities under supervision for an appropriate period of time after completing the courses. Not more than three or four such students would be enrolled in this try-out series, and the effect of mixing them with extension students would be observed carefully. If successful, it might be practical to expand this type of professional training, combining pre-professional and extension students in the same classes. An appropriate certificate would be granted to those students successfully completing the six months course. Enrollments in extension classes at U.C.L.A. have been excellent ever since the program started in 1953, and it is anticipated that the demand for this service to the prosthetics profession should continue indefinitely. If pre-professional education can be combined with it, so much the better.

U.C.L.A. Prosthetics Education has been happy to participate in the educational sessions arranged by the American Orthotics and Prosthetics Association for their regional meetings in various parts of the country. While in many instances these week-end meetings mean that the instructors must teach all week, then travel to a regional meeting to put on an educational program, then travel back in time to start teaching again without an opportunity to relax, they are all glad to be able to help with this worthwhile program.

No discussion of the part played by U.C.L.A. in prosthetics education would be complete without mentioning the texts and manuals that have been prepared for use by the students in the various classes. In the early days of the program the manuals were printed by the University and distributed by the program. However, the demand for these books became so great, with requests for them coming from all over the world, that it became necessary to turn the publishing business over to a firm that specialized in that work, the Charles C. Thomas Co. of Springfield, Illinois. All major manuals published are handled by this firm. A bibliography of all the books, manuals, and films published by the U.C.L.A. Prosthetics Education Program is appended to this report.

In conducting an activity of the magnitude of the Prosthetics Education Program, it must be recognized that an industrious, intelligent, and conscientious group of people are responsible for past and present successful operation and future development of the program. It is no exaggeration to say that the individuals who make up the staff of the U.C.L.A. Prosthetics Education Program are responsible for the testing and refinement of both teaching content and teaching techniques as seen today at U.C.L.A. Such supervision as this staff has needed has been more to provide them with time and facilities for the work they wanted to do than for any other purpose.

In a professional field where we do not even know for sure how many amputees there are in the population, it is difficult to assay the exact effects of an educational program such as the one in prosthetics. However, surveys made by the Committee on Prosthetics Education and Information of the National Research Council, the Veterans Administration, and other agencies that use prosthetics services, indicate that a great improvement in the quality

of those services has resulted from the educational program. It is anticipated that the next nine years will see an even greater improvement, not only in service to amputees and paralytics, but in the professional status of the prosthetist-orthotist as well.

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- Below-Knee Prosthetics*, 160 color slides, 2" x 2", Hall, Sollars, 1960, UCLA Prosthetics Education Program.
- Functional Bracing of the Upper Extremities*, 120 black and white slides, 2" x 2", Anderson, Bray, Snelson, UCLA Prosthetics Education Program, 1959.
- Above-Knee Prosthetics*, 120 black and white slides, 2" x 2", Anderson, Bray, Hennessy, Sollars, UCLA Prosthetics Education Program, 1959.
- Functional Anatomy*, 40 color slides, 2" x 2", Bray, UCLA Prosthetics Education Program, 1960.