## JUNE, 1955

The journal of the Limb and Brace profession

## Orthopedic and

Prosthetic

Appliance

Journal

National Assembly Plans Failure of Orthopedic Parts Hand Design

> published jointly by Orthopedic Appliance & Limb Mfrs. Association American Board for Certification

## DATES TO REMEMBER - 1955

### What • When • Where

#### OCTOBER

- 14-15 EXAMINATION FOR PROSTHETISTS AND New Orleans, La. ORTHOTISTS—Conducted by the American Board for Certification. Deadline for applications: August 14, 1955.
- 16-19 NATIONAL ASSEMBLY OF THE LIMB AND New Orleans, La. BRACE PROFESSION Jung Hotel

#### NOVEMBER

16-18 NATIONAL REHABILITATION ASSOCIATION St. Louis, Mo. —Meeting. (Section on Prosthetics to be pre- Jefferson Hotel sented by a panel from OALMA).

### WELCOME TO NEW MEMBERS OF OALMA

These firms have been elected to membership in the Orthopedic Appliance and Limb Manufacturers Association:

Freeman Manufacturing Company, George F. Freeman, President, 900 West Chicago Road, Sturgis, Michigan (Associate membership)

Keystone Cane & Crutch Company, Charles Yancey, Owner, 826 George Street, Norristown, Pennslyvania (Associate membership)

Ramage Brace Company, Forrest C. Ramage, Owner and Manager, 109 East College Street, Florence, Alabama.





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PAGE 2

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K. L. ATKINSON

President

PAGE 4

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## Orthopedic

## and

## Prosthetic

## Appliance

## Journal

(Title registered U. S. Patent Office)

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## A Report from The President of OALMA

Since the last JOURNAL, many of our regions have held their Annual Regional Meeting. I was fortunate to be able to attend the meetings in Memphis and Kansas City. We had a fine turnout, much technical information was brought out by lectures, demonstrations or "bull sessions" and every one had a good time as well. I missed the Dallas meeting due to the flu, but understand their meeting was an excellent one also. In fact the news I hear from all Regional Meetings is that they were excellent.

Many of our members don't seem to have the word yet on Apprenticeship. If you know of an apprentice fitter who hopes some day to be a Certified Prosthetist or Orthotist, he should be enrolled in the official OALMA Apprenticeship Program. The first step is to send the apprentice's name to OALMA headquarters.

You will be asked to fill out an Apprentice Evaluation Form which will give the apprentice's background up to date, including working experience and education.

This information is to be sent back to the OALMA and the apprentice's background will be studied and evaluated by a member of the Education Committee, Mr. Carlton Fillauer. The apprentice and his employer will then be informed just what the apprentice is expected to do, to be qualified to take the Certification examination.

I know you are going to be pleased with the program for the 1955 Assembly. I have just received a copy of the tentative program. This year the plan is to conclude the Assembly with the banquet Wednesday night, thus enabling members to return home as early as desirable Thursday morning.

> Sincerely yours, McCarthy Hanger, Jr. President

**ORTHOPEDIC & PROSTHETIC APPLIANCE JOURNAL** 

### National Assembly To Meet At New Orleans

#### October 16-17-18-19

New Orleans, America's most interesting city, is the host for the 1955 Assembly. This annual reunion of the limb and brace profession is scheduled for October 16 to 19, with the Certification examinations taking place October 14 and 15.

The Jung Hotel, located on famous Canal Street, is the Assembly headquarters. Close by is the famous "Vieux Carre" or Old Square, popularly known as the French Quarter. Here the old-world atmosphere of the early city can be captured. The narrow streets, fancy iron balconies, and mysterious passageways recall the days of Andrew Jackson, Audubon the naturalist, the Lafitte pirates, and many other noble or sinful personalities in the city's past.

Flags of three nations have flown over New Orleans. More than any other American city, it offers a distinct foreign atmosphere. Yet along side with this romantic past, are evidences of Modern New Orleans, a metropolis of world-trade and civilization, with outstanding universities and medical centers.

In the famous city next October will come leading members of the limb and brace profession to attend The National Assembly, sponsored by the Orthopedic Appliance and Limb Manufacturers Association (the first registration actually received at OALMA headquarters came from A. O. Rogers of Anchorage, Alaska, president of the Alaska Orthopedic Appliance Company.)

The Assembly committee has worked out a "power-packed" program designed to satisfy the varied interests of brace and limb facilities, manufacturers, and individual orthotist-prosthetists. Each session is arranged to get the individual and his own problems "into the picture"—to give him answers and helpful data for that "back-home situation."

The unique entertainment resources of New Orleans have not been overlooked. The Assembly visitor can choose his recreation from a dazzling array including A Deep-Sea Fishing Trip; Football between "Ole Miss" and Tulane University; The Second OALMA Golf Tournament, a Tour of the French Quarter, and a Moonlight Excursion on the Mississippi River. Still other possibilities are described by OALMA member Leo Waller in his article on page 15.

But the major emphasis, as always with OALMA, is on technical developments and aids to management. *Professional Relations* has been chosen as the central theme of the three-day meeting.

The Assembly visitor will find profit and satisfaction in such features as:

1. Instructional Courses, offering a choice of "Anatomy for the Brace and Limb Technician"; "Fitting and Alignment"; "The Milwaukee Brace— New Features," etc. (see final program for hours and enrollment requirements)

2. Exhibits, Technical and Commercial, offered by leading suppliers to the brace and limb field. This will be supplemented by research and educational displays. The Jung Hotel has a unique arrangement of exhibit

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#### **Assembly Facts**

- 1. OALMA and ABC hold their annual professional Assembly in New Orleans, Oct. 16-19, 1955. All meetings will be held in the Jung Hotel.
- 2. EXHIBITS—TECHNICAL AND SUPPLY—Apply to OALMA Headquarters, No. 411 Associations Bldg., Washington 6, D. C.
- 3. CERTIFICATION—Examinations will be held Oct. 14 and 15. Apply in writing before August 14.
- 4. REGISTRATION DETAILS and Reservation Blanks will be mailed to you in July.
- 5. A full social program, especially for the ladies, is being arranged.

space leading directly into the Tulane Room where all meetings will be held.

Benedict Pecorella of Buffalo is Chairman of the Exhibits Committee and is assisted by George Lambert of Baton Rouge and Charles Ross of Washington, D. C.

3. Certification Sessions are an important part of the program. The new inspection program approved by the Certification Board will be discussed. The annual meeting on Certification will feature tributes to retiring Board members Dr. T. Campbell Thompson and M. J. Benjamin. "The New Doctor in Town Learns about Certification" is a dramatic presentation with practical value.

4. We Work Together for the Veteran, an interview-discussion between Dr. Robert Stewart, the new Director of the VA's Prosthetic Service, and OALMA Director Glenn Jackson.

5. Bracing for the Arthritic Patient, presented by Erich Hanicke. Other features for the orthotist include: Bracing of the Hand and Arm; Cerebral Palsy Problems; and a special display on Machine Testing and Pre-fabricated Parts.

6. Appliances for the Child interpret the experience of the Michigan Crippled Children Commission, and will prove of value to both brace and limb facilities.

7. The Road to Professional Success is a panel discussion on road-blocks, detours and "wash-outs" which plague the rising young limb and brace technician.

And all that is "only *the* beginning." Still to come are sessions on Rehabilitation Centers; Insurance Company Contracts; The New Prosthetic Schools and Other College Training; "A Spotlight Drama" interpreting your patient "before and after"; the latest in motion pictures—all climaxed by the Presidential Reception and OALMA dinner Wednesday evening. The Program Committee members—Paul Leimkuehler, James Snell, George Lambert, Rudolph Weber and Bert Titus—promise new surprises when you register next October. Mark your calendar now— October 16-19, and add on a few days for a well-deserved vacation.

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## FUN IN NEW ORLEANS

#### **Recreation for the Assembly Delegate**

#### By LEO WALLER

Vice President, Hersco Products Corporation

New Orleans—the magic name that brings the rare combination of real Americana and beautiful, quaint Bohemian France—into one exciting Louisiana city!

Let me just whet your appetite with the wonderful surprises awaiting you in old New Orleans. For the connosieur of fine foods it is truly a paradise. The world-wide fame of Antoine's has made it one of the most popular eating places in the country and a "must" for visitors. The food has kept all of the old-world delicacy and is served in an atmosphere equal to its origin. Antoine's is located at 713 St. Louis and has been owned and operated by the same Alciatore family for over 100 years. For the real gourmet however, one restaurant would hardly serve as an adventure, Well, never fear, New Orleans can keep you enjoying good French and Creole food as long as your figure can take it. Arnaud's is another old-world restaurant founded 30 years ago by Arnaud Cazenave who was affectionaly given the title "count" by gournets all over the world as a tribute.

Had enough to eat? Well then, how about a walk through some of the historical sites of New Orleans. For Civil War color there are the *Beauregard* Houses. One of the houses located at 934 Royal was the home of the General and his son for many years after the Civil War. It brings back all the wonderful memories of the stories about the "colorful Creole" who commanded West Point and is remembered for the order to fire on Fort Sumter. The other house, located at 1113 Chartres, was his residence for only one winter, but was renamed in his honor by its owners and still



Leo Waller

maintains the old southern charm of Civil War New Orleans.

Perhaps the open air would be more to your liking. New Orleans has taken care of this too. The site of the Battle of New Orleans is now Chalmette Park though it once was a beautiful plantation, Chalmette de Ligny. For the more energetic visitor there is City Park which not only boasts Delgado Museum, the famous Dueling Oaks, and the tomb of Louis Allard the original owner of the land, golfing, swimming, baseball, but football, tennis, and game fishing. For those who prefer to be "sport spectators" there are acres of green grass, art exhibits, and flowers for the aesthetic.

For the woman who cannot resist the lure of antiques, New Orleans has an exciting, though expensive way to have fun. The business of antiques

is a very busy one, in fact, the French quarter boasts 50 antique shops alone. The antique industry in New Orleans first started after the Civil War when the impoverished Creole and French families were forced to sell their heirlooms collected over hundreds of years. Today there is still a steady trickle of genuine antiques from the surviving families plus expert copies which make even the seasoned eye stop and marvel, and add a touch of excitement to the antiquing adventure.

For the amateur art lover the French Quarter is a haven of art work. Because of the cheap living and Bohemian life, many struggling artists have settled in this guarter. For a small pittance they will paint or sketch your portrait in pastels as you stroll by. Perhaps once you have viewed these amateurs, the professional art will hold more of an attraction for you. In that event, the Delgado Museum is open every day till five (except Mondays.) Admission is free and the changing exhibits and art lectures will certainly help you to while away several hours in browsing.

Now that you have spent a busy day in New Orleans, you certainly don't want to let their glorious evening go to waste. May we suggest a visit to Basin Street, the home of jazz? Though the original district was shut down by military order before World War I, several of the original pioneers of Dixieland have returned and are still entertaining in Basin Street. There you will hear the true jazz as it was taken from the African natives and transplanted to small combo rhythms. The New Orleans Jazz Club, realizing the city's musical heritage, has been organized to protect the relics and records of the "birth of the blues."

In order to be a "real New Orleans" native for the length of your stay, it is important to know the language of the city. In New Orleans one doesn't drink anything as plebian as plain coffee. Coffee made with chicory is the local drink, and I understand that once you get to like it the other tastes thin and watery. Chicory is a vegetable like carrots and, believe it or not, grows in Michigan where they never even heard of Chicory coffee.

For a real Louisiana specialty, try Jambalaya. No, this is not one of the local native girls, but rather a succulent, savory stew that may contain any type of meat but always has a boiled rice base.

There are several other expressions which differentiate you from the "tourist" and the "real Creole" (which by the way is a direct descendant from the French and/or Spanish settlers of New Orleans.)

*Banquette*, is not something where you eat seven courses, but the Creole word for sidewalk. Naturally! And in Louisiana they don't have anything as ordinary as a small creek or a tiny river. Why, "suh," in New Orleans that's a Bayou. There are about 275 bayous in Louisiana-temperamental streams that sometimes flow backwards depending on the water level. Some of them are navigation channels, others glorified drainage ditches, but NEVER are they creeks. Creole cooking in the true style is a culinary art, a combination of Europe and Latin American influenced by the Negro and the Indian and the history and habits of the Deep Delta. Quite simply, it is the skillful use of spices and seasoning to make a real treat.

The color and beauty of New Orleans can certainly not be described in one short article. To visit this fabulous city is to love it and have it become a part of you. This is just a tantalizing introduction, like the hors d'houvres before the main dish. The only formula that is surefire for a delightful time in New Orleans is to take advantage of the multitude of entertainments it offers. The only advice before you go—HAVE FUN!

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## WE BUY HOPE FOR VETERANS

#### The Work of the Service Contracts Section

#### By MRS. ADENIA STEARN

Chief, Service Contracts Section, Procurement Division, Supply Service, Dept. of Medicine & Surgery, Veteran Administration



Mrs. Stearn confers with D. M. Zimmerman, Technical Advisor (left) and with J. J. Pitrone, Purchasing Agent.

My Section is responsible for the procurement of many and varied services, one of which is very familiar to the majority of the readers of this *Journal*, the procurement of prosthetic and sensory aids and rehabilitative services for veterans.

The Service Contracts Section of the Procurement Division, Supply Service, Department of Medicine and Surgery, Veterans Administration, holds a unique position in the Federal Government Service. I do not believe there is a counterpart in any other branch of the Government. This small Section (of which I am the Chief, Mr. D. M. Zimmerman my Asssistant and Technical Advisor, and Mr. J. J. Pitrone, one of the specially trained Purchasing Agents), has a staff of 23 employees. It is responsible for the procurement of services and/ or supplies incident thereto of many and varied types, which results in expenditures of approximately \$45,000,-000.00 per year.

Briefly and generally stated, we are responsible for contracting for all services of a continuing nature necessary to the medical installations of the Veterans Administration in the furnishing of medical and related services to eligible veterans as required by law. This includes centralized contracting as is done in the procurement of artificial limbs, as well

as the staff supervision of field stations for those services contracted for locally, such as braces, supports, and other medical and operational services. This contractual responsibility involves all of the procurement functions based on medical and technical requirements.

These contract services include, but are not limited to, out-patient medical care and treatment, through state medical associations and individual contracts; hospital care, through private, state, or civic hospitals; pharmaceutical and nursing services, whereby these services are brought directly to the veteran in his home; motion picture film rental service, both 35mm and 16mm, which result in the Veterans Administration receiving the latest and newest films for showing to its hospitalized veterans.

In addition to these medical and recreational services, the Service Contracts Section is responsible for contracting for such medically prescribed services and Supplies as:

1. The furnishing of artificial legs, arms, hands and their component parts and accessories;

2. Stump socks for the amputee;

3. Orthopedic shoes for the veterans with deformed or crippled feet;

4. Hearing aids and the necessary batteries for their operation;

5. The medical treatment incident to testing, fitting, and issuance of the aids; the instruction and therapy of speech rehabilitation, lip reading, etc.;

6. The examination, fitting, and supplying of optical lenses, frames, and cases;

7. The furnishing of plastic eyes; and

8. Guide dogs for the blind.

The furnishing of staff supervision to our field stations for the local procurement of such items as braces, supports. elastic stockings, arch supports, etc. is also an important function of this Section. This involves the furnishing of instructions and guidelines, formats, standards, specifications and policies, to the local contracting officers at our field stations. These rehabilitative contracts, one of the largest functions of the Service Contracts Section, is a continuous allyear-round project and receives continuous and concerted study, research and development, in order to procure, in accordance with medical requirements, at the least cost to the taxpayer the most advanced, improved and economical prosthetic or orthopedic device possible to any amputee, deaf or blind person in the entire world.

Contracts covering medical research, research and development in the field of artificial limbs, improvement for the blind, the deaf and the handicapped, are also consummated by the Service Contracts Section.

Some of you are no doubt familiar with the research services being carried on in the field of prosthetic appliances. Many of the institutions carrying on these programs are under contract to us. We consummated the contract with the National Academy of Sciences, which supports the Advisory Committee on Artificial Limbs, of which General Strong is Executive Director.

In addition, there is also the maintenance and operational services, which are a function of this Section, the procurement of heat, involving contracts covering approximately 700,000 tons of coal annually, which must be procured in accordance with the carefully planned specifications and requirements established by the Veterans Administration's Engineering Services. We contract for or provide staff supervision for local procurement of gas, electricity, water, sewer disposal, garbage and waste disposal, pest control, the inspection and maintenance of expensive and elaborate equipment, such as highspeed elevators, x-ray equipment, motion picture equipment, and centralized radio receiving equipment.

We also contract for many other special and unusual types of services

required from time to time. For example, we have consummated contracts for processing Governmentowned surplus butter, which is stored in a frozen state in 70-pound cubes, into one-pound prints and individual patties to make it usable in VA kitchens and dining rooms. We recently made a contract with a city Police Department for two-way radio service between their squad cars and our station guard vehicles. We made contracts for the filming, production and printing of some unusual motion pictures of operations on the various joints of the body, which films were produced by Mr. Robert B. Churchill, in California, over a period of several years. These films are now available to the public at minimum costs.

With a small staff of 23 persons, you can understand why it is sometimes impossible to handle quotations and letters as fast as we would like to. Needless to say, some of these persons handle several programs, having widely varied characteristics and just as varied governing regulations. Nevertheless, these persons have become specialists in one or more of these various services with which we deal.

#### **Artificial Limb Contracts**

We know a great many of you readers are artificial limb manufacturers. and will therefore be interested in the following information regarding our plans for the continued procurement of those items. Early next month we will begin working on the new solicitation of quotations for furnishing artificial limbs to the Veterans Administration for the calendar year 1956. This involves a great deal of work, even before we mail the quotation forms to the industry, such as developing and drafting the form, coordinating it with other interested elements of the VA, and reproducing the printed copies.

It has been two years since the VA solicited quotations for artificial limbs. Through the cooperation of the limb manufacturers, we were able to renew nearly all of the contracts for the current calendar year. We now feel that, in fairness to the industry and the Government, we should negotiate new contracts for the period beginning January 1, 1956. This action will be advantageous to both parties, since many changes have taken place in the industry during the last two years, new products have been developed, and others discontinued. There have been price revisions, new marketing techniques and new manufacturing methods.

From the Veterans Administration's point of view, we too have developed several minor changes in our format and procedures. Although, the form and price schedule will remain essentially the same as now, we feel that some additional new items and the deletion of other minor items will be an improvement. Of course, there have been changes in the "boiler plate," those standard contract clauses which we are required to include in all Government contracts by law or Executive Order.

#### **Key Personnel**

Eight of the 23 employees of the Service Contracts Section play an important part in the processing of the artificial limb proposals. I would like to tell you a little bit about them.

I have been Chief of this Section for 11 years and "rose from the ranks" so to speak. I started as a stenographer, progressed from there to the Control Desk, to a "Contract Examiner," to Assistant Chief, and then Chief of the Section with the responsibility for administrative supervision over all activities and functions performed by the Section.

D. M. Zimmerman, Assistant Chief and Technical Advisor, came to this Section fresh out of the Air Force in March 1946. He has developed a very good overall understanding of all of the many programs of this Sec-

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tion and is especially well versed in the procurement of the ones for which he is primarily responsible, such as artificial limbs, hearing aids, hearing aid batteries, stump socks, orthopedic shoes, eye glasses, coal, utilities and research.

Joseph Pitrone, a Supervising Purchasing Agent, is an expert on artificial limb contracts, their prices, components and terminology. In addition to artificial limbs, he is responsible for consummating contracts covering optical lenses, frames and cases, orthopedic shoes, stump socks, guide dogs and contracts covering research in the fields of prosthetic and sensory aids.

Mrs. Delaney, a Purchasing Agent, has been with this Section for many years, a very friendly, congenial person thoroughly familiar with our contracting procedures. In addition to artificial limbs, Mrs. Delaney also handles the contracts for optical lenses, frames and cases (eye glasses).

Mrs. Donahue, also a Purchasing Agent, is a comparative newcomer to this Section, having been with us only about a year, although she has been with the Veterans Administration for quite a long time. Very industrious and a fast and efficient worker, Mrs. Donahue has in a short time become quite proficient in examining artificial limb contracts, as well as contracts for other items she handles, which are stump socks, orthopedic shoes, and guide dogs.

Mrs. Botkin, is the Clerk-Typist and general "handy-man" in the Unit. She is responsible for distributing the price schedules to the various VA field stations concerned, and also types most of the correspondence and contract forms used in this work.

Mr. Cozzens runs our mail and control desk. He records each proposal as it comes in and keeps track of it all the way through our processes until completed. Mr. Cozzens does this not only for artificial limb contracts, but also for all contractual services handled by the whole Section, and as well, handles all the incoming and outgoing mail, time cards and office supplies for the Section.

Mrs. Pitrone, is my Secretary, and as such is involved in Section-wide activities. She is mentioned here, since she does considerable work on artificial limb contracts and correspondence, and she is the one you meet first when you visit my office. Tall, blond, and very pretty, "Peggy" will, if and when you honor us with a visit, answer your inquiries or refer you to the proper person.

So you see, we cannot, as much as we would like to, apply all of our time to the artificial limb contracts and your problems. Artificial limbs are a vitally important part of our work though, and starting in July we will be living in a world of artificial limbs, sockets, feet, knees, ankles, wrist disconnects, hands, single wall sockets, double wall sockets, maximum prices, substitutions, certified fitters, and all the rest that goes with it.

With the thought that I am probably being repetitious, let me suggest again, if you will return your proposal forms promptly, follow our instructions and guides as to the form and the description of items, submit fair and reasonable prices and bear with us, we will do our very best to give you, the veteran, and our Government, the best possible service we know how. I know we can count on your cooperation, and I sincerely hope you will count on ours.

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### **PROSTHETIC SCHOOLS TO OPEN**

#### University of Buffalo to Offer Degree

The month of June saw important developments in education for the limb and brace field. This was welcome news to the OALMA Education Committee, which has struggled against odds to develop adequate training programs.

Charles A. Hennessy, Chairman of the OALMA Education Committee, emphasized that the new developments supplement the OALMA Apprentice Program, which is now in successful operation. Apprentices from over thirty States are now having their records checked for enrollment under this new program. Work is also well advanced on the OALMA Textbook of Anatomy to be used by the apprentices. This is scheduled for publication early in 1956.

Mr. Hennessy summarized the new developments under these headings:

1. Post graduate training in prosthetics will be offered at various universities throughout the United States in 1956 and 1957. These courses cover a period of two weeks and are being arranged by the Advisory Committee on Artificial Limbs of the National Research Council. General Fred S. Strong, Chairman of the Committee, has named McCarthy Hanger, Jr., President of OALMA, to the Committee on Prosthetics Education, which is directing these schools. Miles Anderson will serve as Educational Director of the schools. Dr. Anderson is well known to OALMA members through his pioneer work in the arms school at the University of California.

A faculty is now being selected for the first or pilot school, which is scheduled for the month of August at the Oak Knoll Naval Hospital. This will be followed by a school at New York University, January 9-27, and at Los Angeles March 5-23, 1956. The subject matter will stress above knee fitting with emphasis on alignment and evaluation of the completed prosthesis.

These courses are planned primarily to give post graduate study for the experienced prosthetist and Certification is one of the requirements for admission to the course. A selected number of physicians will join the course for four days. Physical therapists will be enrolled a second week.

2. The Institute offers brace and limb training. September 12 is the opening date for a one-year course for brace and limb technicians at the Institute for the Crippled and Disabled in New York City. On that datc twelve students will begin their course. This course is intended to train technicians in braces and limbs.

The majority of the students' time will be spent in the Institute's shops. However, plans have been made for lectures on allied medical subjects and for actual hospital experience.

Tuition fees for the course is set at \$550 to be paid in two installments. Mr. Charles R. Goldstine, Director of the Orthopedic and Prosthetic Laboratory of the Institute, is in charge of the training program.

This course at the Institute marks the first organized training for the brace technician. It helps fill the gap caused by the discontinuance of the symposia on orthopedic appliances held at Mellon Institute in previous years.

3. The University of Buffalo Opens a School for Prosthetists. As this Journal goes to press, the University of Buffalo is awaiting final word from the U. S. Office of Vocational Re-

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Charles Hennessy, Chairman, OALMA Educational Committee, welcomes Guillermo Martinez, a prosthetist from Guatemala, upon his arrival in Los Angeles. With Martinez is Francisco Franco, Guatemala, former electrical lineman, who lost both his arms from electrical burns. Martinez brought Franco with him for a consultation with prosthetists, therapists and surgeons in the Los Angeles area.

habilitation on a grant financing its curriculum in prosthetics. Unless there is a last minute hitch, this four-year program will get underway in September. Successful graduates will receive the degree of Batchelor of Science in Prosthetics. The course outline includes three years of general college work and a fourth year specializing in artificial appliances. Plans are also being made for an orthopedic appliance curriculum.

Joseph E. Traub, C.P., will serve as Technical Director of the University program in these fields. The University has appointed an advisory Board to help plan and develop the program. The members include Dr. Charles O. Bechtol, Dr. Donald Covalt, Dr. George Young, Dr. Sidney Fishman, McCarthy Hanger, Jr., and Lucius Trautman.

4. The first adequate description of a career in the limb and brace field is included in the new "Health Careers Guidebook." During the month of June, copies of this book were distributed to over 20,000 high schools and colleges, where it will be used to advise senior students about employment opportunities in these fields. OALMA Headquarters report that a number of high school and college seniors have expressed an interest in limb and bracemaking as a lifetime career after reading this Manual.



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## ARTIFICIAL LIMB AND BRACE WORK RATED ESSENTIAL

#### **Government Revises List of Critical Occupations**

The Federal Government cut down its list of essential and critical activities in March, but still retained the Orthopedic Appliance and Limb Technician in the critical category. The purpose of this listing is to help the fair and equal distribution of skilled manpower by the Armed Services, Defense production, and civilian economy. The lists are used by the Defense Department and local Draft Boards in considering requests for delay by persons who have been classified as 1-A, or by Army Reservists who have been classed for active duty.

Other professions in the critical list include physicians, nurses, tool and die designers, pharmacologists, pattern-makers, physicists, etc.

We are quoting here the definition of the orthopedic appliance and limb technician given in the critical list.

ORTHOPEDIC APPLIANCE AND LIMB TECHNICIAN (5-09)—General Definition:

Lays out, makes, and fits artificial limbs and other devices according to customers' specifications and medical prescriptions: Studies specifications or makes plaster casts of stump and normal limbs or body deformity, employing knowledge of limb structure. Selects stock lumber, fibre, metal, or leather, and draws patterns to scale or marks materials. Cuts and carves wooden limbs to specified dimensions, using hand and machine carving tools. Finishes limbs following preliminary fitting by removing wood from exterior or interior parts to reduce weight and obtain proper balance and contour, and fills, sands,

and polishes wood. Winds damp fibres around wood forms in fibrewinding machine. Shapes, anneals, and welds sheet-metal tubing and assembles parts of limbs, using bolts, screws, and rivets. Cuts, positions, stretches, molds, and sews plastic or leather to cover limbs or fabricate parts such as leather stump sockets.

Makes and repairs arch supports. orthopedic braces, and appliances for feet, legs, and body deformities; cuts and fashions supports from stainless steel, plastics, cork, steel, and leather, using welding equipment, shears, rivet punch, electric drill, chisels, saws, hammers, and other hand tools. Fits assembled artificial limbs and devices to customer, and adjusts holdingharnesses. This definition includes all titles in the Dictionary of Occupational Titles code group 5-09.400-5-09.599, except Surgical-Elastic Knitter, Hand Frame; Artificial-Limb Assembler: Seamstress; Socket Maker; Plastic-Bucket Maker; and Welderand-Finisher.

#### SUBSCRIPTIONS . . .

A special subscription rate of \$4.00 a year is available to (1) Physicians (2) Non-certified limb and brace personnel (3) Porsons and firms which are not eligible for membership in OALMA. Subscription orders should be sent ta:

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### DR. ROBERT E. STEWART PICKED FOR KEY VA POST DR. THORNDIKE TO BE CONSULTANT

Dr. Robert E. Stewart has been named to succeed Dr. Augustus Thorndike, as Director of the Prosthetic and Sensory Aids Service of the Veterans Administration. The appointment is effective as of July 1, 1955.

Dr. Thorndike resigned from the VA to return to Harvard University as chief surgeon to the Department of Hygiene of the university. However, he will continue to serve as a consultant on prosthetics to the Chief Medical Director of the VA.

Dr. Stewart's new post is in recognition of his outstanding record as Assistant Director since 1949. The work of the Prosthetic and Sensory Aids Service was praised in the report issued by the President's Committee on Veterans' Medical Service, under the chairmanship of Dr. Howard A. Rusk. The Committee declared that the Service, since its reorganization under Doctors Thorndike and Stewart "has been functioning with commendable results."

The new director is a graduate of the School of Dentistry at Creighton in Omaha, Nebraska. He was engaged in private practice until 1942 when he entered active military service.

During World War II, Dr. Stewart was one of a few members of the Army Medical Corps trained in artificial facial and body restoration at the Army hospital in Valley Forge, Pennsylvania. He joined the staff of the VA in 1946 to establish a similar program.

Dr. Stewart is a member of the American Dental Association and the American Academy of Maxillo Facial Prosthetics (President in 1954). He has attended numerous OALMA meetings.



Dr. Stewart (right) is Congratulated by OALMA Director Glenn Jackson



Dr. Augustus Thorndike Continues as Consultant

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### CERTIFICATION EXHIBIT SHOWN AT WORLD'S LARGEST MEDICAL CONVENTION



Asst. Director Lester Smith and John A. McCann, OALMA Regional Director, on duty at the Exhibit. The Certification Emblem on the table in front is the work of B. A. Sandstrom, C. O., Kansas City, Missouri.

A new display on "Certification Today" was one of the features of the Scientific Exhibit when the American Medical Association met at Atlantic City the first week in June. This annual meeting is the largest medical convention in the world. Over 15,000 physicians and some 11,000 guests from related fields were registered.

The exhibit which is shown above, was arranged by Lester Smith, Assistant Director of the American Board for Certification. It included photographs and charts explaining the Certification movement to the physician, and a selected display of braces, artificial limbs and cosmetic gloves. The Certified technicians who were on duty at the booth included: Alfons Glaubitz, Jerome Kessler, A. A. Margoe, John McCann, Basil Peters, and Charles W. Wright.

The appliances shown were changed from day to day so that the physician passing by the booth, which held a corner location in the Orthopedic Surgery Section, might see a different brace or limb whenever he came by. The following facilities and firms made their products available for this purpose: The City Surgical Company, Dorrance-Hosmer, John N. Eschen Co., Inc., J. E. Hanger Company of New York, Laurence's Orthopedic Appliance Co., Inc., Orthopedic Services of Rhode Island, Pennsylvania State Hospital for Crippled Children, Prosthetic Services of San Francisco, Milton and Adele Tenenbaum.

### VA EXHIBIT

The medical and prosthetic personnel of the Veterans Administration were prominently represented in the Scientific Exhibit Section. "Toward Better Bracing" was the theme of the principal VA Exhibit, which was arranged by Dr. Augustus Thorndike, Eugene F. Murphy and Anthony Staros of the Prosthetic and Sensory

Aids Service. They were assisted by John MacMurray. The use of temporary training prostheses made by Emil Houk, C.P., was shown in an exhibit arranged by the medical and prosthetic staff of the VA Hospital in Hines, Illinois. Doctors M. D. Flank, J. F. Kurtz and Erma A. Smith, were in charge of the exhibit.

Other exhibits of special interest to the brace and limb field included:

"Classification of Early Lateral Deviations of Spine Following Poliomyelitis" by Dr. Robert L. Bennett of the Georgia Warm Springs Foundation, Warm Springs, Georgia.

"Ambulation of the Elderly Amputee" by Doctors Harold Dinken and John S. Young, and Bruce A. Scott, C. O. of Denver.

"The Rehabilitation of Children with Muscular Dystrophy, Spina Bifida, and Amputations and Some of the Prostheses, and Equipment used in Their Rehabilitation," by Dr. G. G. Deaver, Institute of Physical Medicine and Rehabilitation, NYU-Bellevue Medical Center, New York.

"Operation of the Prosthetic Team in a Rehabilitation Center" by Dr. O. Leonard Huddleston, William Henderson of Santa Monica, Cali-

fornia and Dr. Sedgwick Mead, of Vallejo, California. The exhibit consisted of photographs, charts, posters, drawings, prosthesis components, and illustrations of upper and lower extremity prostheses. The significant points presented were: (1) the importance of the treatment of amputees at a rehabilitation center; (2) the teamwork approach to the management of amputees; and (3) the development and organization of a prosthetic team, consisting of physiatrists, occupational therapists, physical therapists, prosthetists, and consultants, consisting of orthopedic surgeons, psychiatrists, clinical phychologists, medical social worker, and rehabilitation officer.

"Conquering Crippling Through a Community Rehabilitation Center" by Lawrence J. Linck and Jayne Shover, National Society for Crippled Children and Adults, Inc., Chicago and Edward Scull and June Sokolov, Connecticut Society for Crippled Children and Adults and Hartford Rehabilitation Center, Inc., Hartford, Conn. The exhibit featured demonstrations of rehabilitation techniques by rehabilitation personnel, including doctors, therapists, and others, with actual patients.

### "What's New(s)"

• PROSTHETIC SERVICES OF SAN FRAN-CISCO has doubled its floor space in an expansion move. The new address is 175 Jessie Street, San Francisco. C. O. Anderson, President of the firm, reports that the additional floor space was needed to take care of the company's increasing cosmetic leg cover production.

• P. D. FRISBY, former owner of the Lake View Brace and Surgical Supply Company of Chicago, is now in business in Decatur, Illinois, at 1212 East Wood St. The new firm name is: Frisby Orthopedic Appliance Company.

• ALEX C. WEILAND has retired from business and has sold his firm, the Standard Artificial Limb Company, of St. Louis, to Wesley M. Briscoe. Mr. Briscoe, a Certified Prosthetist, is a long-time employee of the Company.

Chester C. Nelson of Minnesota is the new President of Region VII. He will preside at the 1956 meeting of the Region. This will be held some time in April 1956 at Omaha, Nebraska.

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# What Certification Means to the Individual: A Reminder from the President of the Certification Board

"Two men looked out from behind their prison bars—one saw the mud, the other the stars." How true this has been in our Certification movement, particularly seven years ago when it was first started. Groups of individuals, all over the United States, who had heard about the new movement were discussing it. It just seemed that so many people saw the "mud" and felt that there was no advantage and no help to be received from certification. Others saw the "stars" and realized the opportunity to lift themselves and our profession to the new high standards which we have today.

I think it would be interesting at this time to see what Webster has to say about certification. To get the full picture, we must use the words certificate, certification, and certified. The Webster dictionary says:

CERTIFICATE means to certify or attest with a certificate; it is a written declaration or testimonial; a writing signed and legally authenticated.

CERTIFICATION means the act of certifying; a certied statement; an attestation.

TO CERTIFY is to give certain knowledge of; attest; to make a statement to as matter of fact; assure; to give a certificate of; to make attestation either in writing or orally as to the truth or excellence of something.

Now, taking the meaning of Webster's words, which, I am sure, everyone here will agree is the thing which we are trying to do, I would say that certification means a direction to go; it means more education; it means more cooperation with one another; it is a means to a good future.

Certification is a plan for the future. Confucius centuries ago felt the same, because he said: "A man who does not think or plan long ahead will find trouble right by his door." So to me certification in this plan for the future means happiness, better workmanship, better understanding and better appliances.

No one realizes better than I do the problems of changing over our field from a commercial business to a profession. I can assure you that it has been a mountain to surmount, but it has been mighty interesting. It has proved a challenge; it has required many nights and hours of going to school; it has required many hours of teaching school; it has required many hours of giving of one-self for the betterment of the patient and our profession.

The things that have hurt the most and have been the hardest to overcome are the little problems. They seem to be the stumbling blocks, such as:

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What am I getting out of certification?—If So and So is certified, I do not want to be certified.—John Doe has certification and he cannot do half of what he is supposed to do, yet he is on an equal basis with me.— I have not received any more business because I have been certified, and so on."

Yes, that all may be true, but is that what we are concerned about? Is that what we are working for?

No, I would say. What we are working for is the program for the future that Mac Hanger, our OALMA president, is outlining, giving us an opportunity to show in the beginning, when we start, what we have to know and what we must accomplish before we can do a good job. As one writer put it: "Men do not stumble over mountains but over molehills."

Another famous writer puts it this way: "The only thing more expensive than education is ignorance."

Light attached gives out light. When it becomes loose and detaches, it becomes junk. With over a thousand certified people in the country today, each giving out light and enthusiasm of certification, there is no question but what we have one of the best opportunities in the world of doing good and serving mankind in a manner which no other profession can do and in a manner which is always on the positive side of light.

Our good friends in the medical profession who are serving mankind, have their places; but I often wonder how it seems to have to amputate a man's limb and then the next morning go in to the convalescent's room and face him.

It is true that the doctor has saved the man's life but he has also taken away either his mobility or his utility and has no method whatsoever in which to replace it. I see no reason why every one of us shouldn't experience the biggest thrill of our lives each time we put on an appliance that makes one of our fellowmen whole again.

Voltaire, one of the greatest writers of all times, puts it this way: "The greatest privilege of a human being is to be able to do good." I feel that we have been God's privileged people when we have been given the opportunity of becoming certified.

It is not many years ago when one of us walking into the place of business of a competitor to pay a friendly visit, would get no farther than the reception room. I can remember in my own shop, when I first started, if I saw a mechanic doing something that I wanted to know about, and I walked over to him, he would put it under his bench until I had left. I have been told flatly by artificial limb mechanics in the past, when I have asked them questions, "No, I won't help you. I had to learn the hard way and you can do it the same way." I made up my mind many years ago, If I ever did learn anything about the limb business, that I would take the opposite attitude and tell and show everything I could possibly learn. I have sincerely tried to be that way.

Today most every artificial limb house will take you through their facility and explain to you practically anything you want to know, if you see something of interest. I believe Certification has done this. I believe sincerely that it has united us, and, if united, we can do nothing else but improve.

Certification has given us something to work for and to believe in, and what else does man have in any walk of life than those two things?

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### WHICH LEG?? Comment by "The Observer"

When a unilateral amputee acquires a prosthesis, the resulting conversation includes frequent reference to the limb which was not amputated.

It is my observation that the reference made is to the "good leg," or to the "normal leg". Limb fitters who have the habit of speaking of the "normal leg" seem to use the term no matter how abnormal the leg may be. If he distinguishes it as the "good leg," he is disparaging the good artificial limb which he is providing. What is wrong with calling it the "natural leg"?

The antonyn for "good" is "bad", and we don't want that description given to our masterpiece. The antonym for "normal" is "abnormal", and even this doesn't sound just right for our substitute limb.

We call our substitute limb an "artificial limb". The antonym for "artificial" is "natural". We are not ashamed to call our substitute limb an artificial limb, so why should there be any hesitancy to refer to the natural limb as the "natural limb"!

### -The Observer

(EDITOR'S NOTE: *The Journal* welcomes statements of value from any of its readers. We will be glad to have your comments for future issues.)

### WHAT CERTIFICATION MEANS (Con'd.)

If you hold Certification and are not for Certification and do not believe in it, but have it only because you think it is the thing to have, then I would say that you are not happy in your work nor getting what you are entitled to out of life.

Ella W. Wilcox, puts it this way: "There are two kinds of people on earth today; Just two kinds of people, no more, I say. Not the sinner and saint, for it's well understood, That the good are half bad, and the bad are half good. Not the humble and proud, for in life's little span, Who puts on vain airs is not counted a man. Not the happy and sad, for the swift flying years Bring each man his laughter and each man his tears. No, the two kinds of people on earth I mean Are the people who *lift* and the people who *lean*. And oddly enough, you will find too, I ween, There's only one lifter to twenty who lean. In which class are you? Are you easing the load Of overtaxed lifters, who toil down the road? Or are you a leaner, who lets others share Your portion of labor, and worry and care?"

Diana Iran

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### SOME AIDS TO REDUCE FAILURES OF ORTHOPEDIC PARTS

By FRANCIS L. SMITH, Fellow With JOHN L. YOUNG, Ph.D., Senior Fellow

The Sarah Mellon Scaife Foundation's Multiple Fellowship on Orthopedic Appliances at Mellon Institute, Pittsburgh, Pennsylvania

Most bracemakers have probably had the experience of making an orthopedic part for a number of years without any trouble and then suddenly they have a patient who keeps breaking a part over and over again. The final result is usually valuable time and money lost and a dissatisfied or lost customer.

A large number of these broken parts may be classified as fatigue failures. Fatigue failures generally plague any manufacturer that must constantly make a product as lightweight as possible. The aircraft and orthopedic industries definitely are alike in this respect. Lightweight but strong is easier said than done.

What causes fatigue failure? First of all, fatigue failures occur only on parts that are subjected to repeated loading. For example, the average man puts his weight on an artificial leg or leg brace about one million times a year. This is repeated loading.

Secondly, most fatigue failures involve a stress raiser such as is shown in the accompanying series of illustrations. Stress raisers give the same effect as increasing the load on part of the metal. Some people find it difficult to believe that a file mark, a scratch, or a hammer dent can eventually lead to the failure of a machine part. Of course, without experience, it is also hard to believe the story of the one rotten apple in a barrel.

Thirdly, in order for the failure to occur, there must be stress in the area of the stress raiser. If the stress in this area is low, even a stress raiser cannot raise the stress high enough to do harm. This is probably the main reason many people will look at the the illustrated examples, (see Table) and say, "I've been doing those things for years and never had any trouble."

How can a fatigue failure be recognized? The answer can probably be best made by explaining how the failure occurs.

For instance, let us consider a side bar on an ischial seat leg brace. Every time the patient puts his weight on the brace the side bars are stressed. The back of the side bar is compressed and the front side of that bar is stretched or put into tension. Since fatigue failures are usually caused by tension rather than compression, the front side is the dangerous side. If this front side is polished smooth and the stress is not too large, no damage will be done. If the front side has a stress raiser on it, such as a sharp indentation, then whatever stress happens to be at the sharp indentation will be increased by two, or three, or maybe ten times. If, after this multiplication, the stress is still below what the material can take. no harm will be done. For the purposes of explaining the process, we will assume that the stress at this small pinhead area is too large. One grain or a small particle of the material will fail and the load it was carrying will have to be borne by the neighboring grains. Small individual grains will continue to fail, and eventually a crack, so small no method yet known can detect it, will form. This process, which may take a week, a month or a year to occur, only proceeds every time the man puts his weight on the brace. The initial crack

### HELPFUL HINTS TO REDUCE STRESS RAISERS



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### HELPFUL HINTS TO REDUCE STRESS RAISERS

CAUSE	REMEDY
9. VISE CLAMPING MARKS	PLACE SOFT COPPER ON VISE JAWS
10. CRACKS IN PLATED OR SURFACE HARDENED PARTS	PLATE OR SURFACE HARDEN
II. FLASHING ON FORGING	REMOVE FLASHING
12. SHARP BEND IN CABLE OR WIRE	MAKE BEND GRADUAL
I3. FILE MARKS, HAMMER MARKS, SCRATCHES, NICKS, ETC.	MAKE SURFACE AS SMOOTH AS POSSIBLE
14. WELDED JOINT	MACHINE SMOOTH; ANNEAL IF
15. ANY COLD WORKING	REMOVE COLD WORKING BY ANNEALING. RETEMPER IF NECESSARY
16. WELDING AND HEAT TREATMENT	FOLLOW MANUFACTURER'S RECOMMENDATION
IZ CRACKS DUE TO BENDING	BEND AND ANNEAL IN STEPS
18. CHROME PLATING	BAKE IN OVEN 3 TO 4 HRS, AT 350°F
19. CORROSION	USE ALUMINUM, STAINLESS STEEL, PLATED STEEL, OR SUITABLE NONTOXIC COATING

sometimes appears as a very shiny spot that can be seen after the fracture is completed.

Such a crack continues to grow until the remaining area is too small to support the load. The crack may be detected at this time and caught before failure takes place. If not detected, in a very short time failure will suddenly occur. It will be a quick failure, such as happens with brittle material.

Examination of the failed section will frequently show two distinct nearby areas in addition to the shiny spot mentioned previously. The area close to the shiny spot on the front of the side bar will usually be smoother than the back half of the area. Sometimes the front part will have grooves like those of an oyster shell. The back area will appear the same as an ordinary piece of material pulled apart by one loading. In general, necking or yielding, such as would occur if the patient fell and bent the brace, will not be visible.

The first fourteen stress raisers, or causes of failure that are pictured, can be avoided by proper initial design and by taking a little extra care in machining or handling the parts.

Cold working metal, No. 15, can sometimes do good and occasionally do harm. Unless the type and location of residual stress remaining in the metal and also the type and location of applied stress are definitely known, it is best to remove any effects of cold working. Of course, if no failing of these parts has occurred, the added expense of annealing and retempering them is not warranted.

Welding and heat treatment (see No. 16) have caused many a failure when improperly done. The safest procedure is to follow the manufacturer's recommendations. A Mellon Institute article, entitled, "Heat Treating for Orthopedic Appliances," by John L. Young, published in the May 1951 issue of the *Journal* of OALMA, may be of some help.

Metal pieces can only be bent so

far without causing cracks. If the ductility is so low that a bend cannot be completed in one step without causing cracks, the proper procedure is to bend in small increments, annealing after each small bend.

Bracemakers should realize that any type of metal plating will reduce the fatigue strength of a part. Baking of chrome-plated parts in an air medium will restore some of this lost strength. Although  $350^{\circ}$ F. is shown in the illustration, the best results are obtained by baking at as high a temperature as possible. Naturally the tempering temperature must *not* be exceeded.

Any part that might be exposed to corrosion should be made of noncorrosive material or covered with a nontoxic coating. Corrosion and repeated loading together form a most dangerous team. Plating is to be preferred to corrosion.

Since a number of orthopedic parts are exposed to perspiration of the body, corrosion fatigue probably causes a large percentage of the failures that do occur.

Surface hardening, such as obtained by cyaniding or nitriding, is very beneficial. Often a part that has been lasting only a month or two can be made to last a year or more.

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### Amputee Training in a Rehabilitation Center\*

### By VIVIAN SHEPHERD

#### Director, The Rehabilitation Institute, Kansas City.

The rehabilitation of the amputee is an intensely important part of any program of rehabilitation for the disabled and is of major interest to the prosthetist and, also, of great interest to the rehabilitation center. The rehabilitation process includes such a multiplicity of services that no one discipline or facility can provide all that is required in the total rehabilitation of the amputee and other disabled. It is necessary, then, to develop cooperatively a team, not only of individuals, but of facilities providing rehabilitation service in order to meet the overall needs of the disabled.

For example, the prosthetist with all his skill cannot always effect the rehabilitation of the amputee simply by fabricating an excellent prosthesis, important as that is to the total rehabilitation. Many other factors, outside the prosthetist's control, enter successful into prosthesis wearing-the proper psychological preparation of the patient before surgery, adequate surgery, after care of the stump, and training in the use of the prosthesis. The first two are provided by the physician before the prosthetist or the rehabilitation center sees the patient, while the others can be provided by the rehabilitation center. The use of the center with its coordinated program can be of inestimable value to the physician, the prosthetist, and, most important, to the patient himself.

The ideal in amputee rehabilitation would be a team evaluation for every patient following surgery with the team composed of the physician, prosthetist, physical therapist, occupational therapist, psychologist, social worker, and vocational rehabilitation counselor. The first consideration of this evaluation would be to decide if the patient is potentially a candidate for a prosthesis, and if so, to recommend the services needed to prepare him for successful wearing and use of a prosthesis.

The evaluation of the patient would include these areas:

Physical factors—Range of motion, strength of musculature, condition of stump, etc., and for the arteriosclerotic, diabetic, and Burger's, the condition of the contra-lateral limbstrength, circulation, excoriations of the skin.

*Psychological factors*—the intellectual and emotional factors present that will mitigate for or against the patient being able to wear a prosthesis successfully. This evaluation is especially important in the older age group where the psychological factors may be even more significant than the physical factors in recommending a limb.

Social and vocational factors— The social and vocational factors that must be considered such as family and vocational needs. What use will be made of the limb, socially and vocationally; in the home, on the job —heavy or light use—and many others.

The above simply suggests some of the factors to be considered before

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<sup>\*</sup> Presented before the Regional Conference, 7th Region, Orthopedic Appliance and Limb Manufacturers Association, April 16, in Kansas City, Missouri.



Unretouched photographs of a bilateral amputee, who has become self-sufficient to a remarkable degree.

a decision should be made as to whether or not an individual can become a successful limb wearer and is intended only to point out areas that should be explored before fitting is recommended. When decision has been made that a prosthesis is indicated, the prescription for the limb should be made with consideration for the intended use and the type best suited to the particular individual's needs.

It is often necessary to have a program of physical therapy to prepare the stump for prescription and fitting. This program is designed to increase shrinkage, toughening, strength, range of motion, and correction of contractures, if present. Only after sufficient preparation of the stump should the actual prescription be made. When this program is followed, the prosthetist's work is much simpler for some of the problems that make his task difficult have been overcome and he has an adequately prepared stump for fitting.

Radcliffe (1) states that, "In the fitting of any artificial limb, the goal of the prosthetist is simple to restore to the amputee the ability to perform everyday activities in an easy, natural, and comfortable manner. The basic requirements are therefore three in number-comfort, function, and appearance, the latter embracing both cosmetic appearance and appearance in use. Unless a prosthesis is reasonably comfortable, the amputee will be unable to wear it. Unless it performs the necessary functions with reasonable ease and dexterity, the amputee is not apt to find the device very useful. Unless it is reasonably acceptable cosmetically, and unless it can be operated in a natural manner, the limb is likely to be disagreeable both to the wearer and to his friends and associates."

To achieve such goals, the amputee needs besides a skillfully fabricated limb, adequate training in the use of his prosthesis. Too many times we have seen a limb not being worn, not

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because of improper fitting, but because of the lack of sufficient training in its use. Therefore after fitting, intensive prosthesis-use training should be initiated. With the lower extremity amputee, training is usually given by the physical therapist under medical supervision. The training begins by helping the amputee achieve proper balance using parallel bars, from there proceeding to walking bars where training is given in walking forward, backward, sideward-with instructions in proper hip, knee, and foot motions. Postural instructions are emphasized all through the various steps because without proper stance and positioning, the amputee may not be able to use the limb properly and may even develop secondary disabilities.

Usually with practice, the amputee moves from the walking bars to walking with crutches or canes, and for the unilateral BK or AK, to walking without any support. For the bilateral and tilt-table amputee, a cane or crutches may continue to be necessary.

The amputee is given instructions and practice in walking on the level, or inclines, on rough ground, climbing stairs, curbs, walking with traffic lights, use of public conveyances. Also, important to the amputee is training in how to fall with the least danger to himself, and how to get up after a fall. The therapist emphasises as does the prosthetist, the care and cleaniness of the prosthesis and stump socks as important to the continued care of the stump and future comfort and successful wearing. All through the training period, the prosthetist and the center staff work together on any problems that arise.

The Rehabilitation Institute at Kansas City is participating in the Upper Extremity Field Study being conducted by the National Research Council, and has had a clinic team in operation for about two years. The team received training in special courses held at the University of CaliMrs. Vivian Shepherd has been Executive Director of the Rehabilitation Institute, Kansas City, Missouri, from its beginning in 1947. Under her direction the Institute has expanded from a small beginning until now it has a staff of twenty-two. This includes therapists, psychologists, and clerical staff. Last year the Institute served 1128 patients.

Mrs. Shepherd served as a field counselor with the Missouri Department of Vocational Rehabilitation for five years prior to 1947. She is a member of the Executive Committees of the National Rehabilitation Association, and the Conference of Rehabilitation Centers. She has drawn on this wealth of experience for the material in this article.

fornia, Los Angeles, and has been applying the techniques and procedures taught there for the prosthetic rehabilitation of the amputee. The team is composed of the physician, occupational therapist, physical therapist, the prosthetist, the representative of the Field Study, and often the psychologist and vocational rehabilitation counselor.

The procedure is for the clinic team to see the amputee for evaluation, prescription, initial check-out of prosthesis, and final check-out after prosthesis use training. Check-out tests and training are based on procedures prepared by the National Research Council.

Training of the upper extremity amputee is usually carried out by the occupational therapist and begins with practice of gross motions, such as flexion and extension of the forearm, locking and unlocking the elbow, etc. During this phase the amputee concentrates on body movements necessary for proper operation. When adequate control is achieved, training in the use of the terminal device is begun. Emphasis is placed

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on holding and grasping which are the most frequently used movements. The amputee is then ready for practical application of what has been learned.

Instruction in the performance of daily living activities, including occupational needs and social situations is given. He is helped to coordinate the functions of his device into a pattern of operation most natural and satisfying to him, rather than being forced into a predetermined activity program. He is encouraged to develop his own techniques and refinements, as well as to explore a wide variety of activities.

#### **Final** Training

In the final stage of training, instructions in attaching and removing the prosthesis, changing from one terminal device to another and general care of the appliance are carried out, working closely with the prosthetist on any problems encountered.

Throughout prosthesis training for the unilateral amputee, the remaining limb is trained to become the dominant hand as almost all activities will be performed with the remaining hand with the prosthesis being used in an assistive manner. For the bilateral amputee, adaptive techniques and the utilization of many gadgets must be taught to compensate.

Often during the process of treatment, fitting, and training, psychological problems arise, and the center's counseling psychologist can be of great assistance in helping the patient adjust to his disability and to his rehabilitation program. Also, family situations may be present or develop during the program, necessitating the help of the social worker with the patient and his family. This can be highly important, for the rehabilitation program can often break down completely if family problems are not resolved.

During this time, if vocational adjustment is a part of the rehabilitation plan, the vocational rehabilitation counselor will be counseling with the amputee toward training and placement after, or concurrently with, physical restoration.

This paper has not been given to present a technical description of amputee training, but rather to point out the many factors that must be considered in successful amputee rehabilitation, and to show the worth of cooperative effort on the part of the physician, the prosthetist, the rehabilitation center, state vocational rehabilitation services, and other agencies, to achieve what all are working toward—the most satisfactory and complete rehabilitation of the amputee.

 Radcliffe, Charles W., "Functional Considerations in the Fitting of Above-knee Prostheses." Artificial Limbs, Advisory Committee on Artificial Limbs, National Research Council, January 1955, p. 35.

### "What's New(s)"

• The American Limb & Orthopedic Company of Chicago, has appointed Sheldon Brown to the post of President and General Manager. Mr. Brown took over the new office May 31. Wally Baskovich, former owner, has sold control of the firm to Mr. Brown.

• The New England Council of OALMA (Region I) has named *How*ard Mooney as Librarian for the Region. He and John Buckley of Providence are a two-man committee on Education. They will review books and other articles and make them available to apprentices and members of the Region.

• The J. E. Hanger Company of Pittsburgh, broke ground for its new building May 1. Karl Barghausen reports that they will have 4700 square feet of space and ample parking space. The new building which is located at 34th and Liberty streets, will be ready in September.



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### Rehabilitation Leaders Confer Atlantic City Conference Promotes Teamwork

The heads of some forty different rehabilitation agencies gathered in Atlantic City May 16 and 17 to discuss current developments and trends in this field.

This was the third annual conference of this kind. The first one, sponsored by the National Rehabilitation Association, was an informal affair called to see whether there might not be real advantage in the Heads of rehabilitation agencies gathering together. The experiment proved so successful that it was continued last year, and this one became, therefore, the third annual conference. Its stated purpose is to enable executives of agencies concerned with the rehabilitation of the handicapped to explore and analyze together trends in rehabilitation, particularly in respect to community planning, research, personnel training and professional teamwork, and to enable them to profit from the exchange of information and development of better communication with each other.

The Conference brought together agencies of all types. There were the government agencies and the private agencies. Probably the scope of the Conference is well indicated in the make-up of the Conference Planning Committee. This Committee consisted of: Pearce Bailey, M.D., of the U. National Institute of Health: S. Donald Dablestein of the Office of Vocational Rehabilitation: Kathern F. Gruber of the American Foundation for the Blind; Helen Hollingsworth of the Office of Vocational Rehabilitation; Henry A. Imus, M.D., National Institutes of Health: Glenn Jackson, Orthopedic Appliance and Manufacturers Association: Limb Kenneth Pohlmann, United Mine Workers Welfare and Retirement Fund: Percy J. Trevethan, Goodwill Industries; E. B. Whitten and Alvin D. Puth of the National Rehabilitation Association. Besides serving on the Planning Committee, Mr. Jackson, the Executive Director of the Orthopedic Appliance Association, served as moderator for the Tuesday forenoon session, which was devoted exclusively to the question of training of personnel for the field of rehabilitation.

### Orthopedic Disabilities Rank Third

The Conference opened with an analysis of trends in community research and planning presented by Dr. Gordon Hatcher of the Community Research Associates. Dr. Hatcher reported on research projects now underway in three pilot cities and counties. One of these is devoting its entire effort to analyzing the health of the people. The second relates to delinguency, and the third to the causes for economic distress. For the purpose of this Conference Dr. Hatcher was providing some summary figures as of types of diseases which afflict a typical population. The study was based upon over 300.000 persons. Probably most interesting to readers of this Journal is the fact that out of a typical population of 80.000 it was found that 344 suffered from heart disease and arteriosclerosis. The second most frequent affliction listed are nervous diseases and a figure of 272 people. Then comes the third affliction, titled "Major Orthopedic Impairments" and 224 people are listed under this head.

The Monday afternoon session was devoted to question of research in the field of rehabilitation. The Tuesday morning session as noted above, was devoted to personnel. Then came the Tuesday afternoon session which gave attention to the problems of develop-

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### Leimkuehler Elected President of Ohio Rehabilitation Association

Shown above (right) is Paul Leimkuehler of Cleveland, new President of the Ohio Rehabilitation Association. With him left to right are the other officers: Vice President Mrs. Hope M. Bair, Akron; Board Member Dr. Emily Hess, Cincinnati; and Treasurer John N. Patchen, Athens.

ing better understanding among the professions and agencies concerned with rehabilitation. This session was opened with a paper by Willis C. Gorthy, Director of the Institute for the Crippled and Disabled, and was later discussed by John Henneman of the American Medical Association, Jane Shover of the National Society for Crippled Children and Adults, and J. Hank Smith, President of the National Rehabilitation Association.

In these formal presentations and in personal talks held between sessions, it was perfectly obvious that rehabilitation is on the move and is fast becoming one of the dominant phenomena in American social and economic life. When asked to give his dominant impression of the Conference as it might relate to our own particular field, Mr. Jackson responded that he felt the question was best answered by giving the answer of the one of the leaders of the Conference, when Mr. Jackson raised the question as to what place in the rehabilation picture the orthopedic and prosthetic appliance industry might take. The answer was that because of the remarkable progress made during the past few years the industry had become a highly respected factor in the field of rehabilitation, and should it continue to progress in improved techniques and keeping abreast of the times, this industry would become an increasingly important factor in rehabilitation.

The 60,000 persons now engaged in rehabilitation work would over the next ten years increase to a total of 200,000.

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### Problems in Design of Artificial Hands MAURICE J. FLETCHER, Lt. Col., USA (MSC)

Director, Army Prosthetics Research Laboratory, Walter Reed Army Medical Center, Washington, D. C.

Exact duplication of so intricate and efficient an organ as the human hand is, for all practical purposes, an impossibility. Lacking the power sources, nervous sensitivity, and automatic reflexes available in the normal hand, the designer is faced with the problem of providing a prosthesis that at least conforms to exterior configuration of the living counterpart. For many reasons, the replacement should present such a high degree of fidelity that it cannot be distinguished as an artificial device. But exterior reproduction limits the number and kinds of controls that can be incorporated into a fixed internal area.

The human hand is powered by some 24 separate muscle groups and is endowed with a cooperative pattern of sensitizing nerves. Motions in the normal are reflex or automatic, and very little conscious effort is required to manipulate the hand or fingers into a position of utility. In the amputee, however, such "mindcontrolled" power sources and nerve supplies are not available to the designer. Although it is possible mechanically to provide substitute motions for almost all normal activities. lack of adequate control sources makes it impossible for the amputee to operate such device. It is necessary first to determine the optimum number and kinds of digital motions of the hand and what forces are required to operate the mechanism. It also is necessary to supply the prosthetic replacement with a motive source that is simple to operate and, at the same time, can provide the finger forces necessary for efficient prehension.

Scapular abduction provides a satisfactory major source of control, and it can be used to best advantage when there is some motivating stump remaining on the amputated side. In such a case, the opposite shoulder is used only as an anchor point. The forward thrust of the stump in the artificial arm provides the force and displacement required to activate the control mechanism that transmits operating forces to the fingers (9, 11).

All of these things considered, the designer of an artificial hand is restricted in the sense that he has at his disposal a limited source of power supply to operate any given device. Further, any hand prosthesis should be completely independent of the other hand, whether that hand be normal or artificial. In addition to these factors, the designer must consider the requirements of functionality and cosmetic appearance. Once the limitations and requirements involved are understood fully, it then becomes possible to outline some practical design criteria.

### DESIGN CRITERIA

### Finger Forces

For simplicity and ease of operation, input control to the hand should be a single control requiring but one cyclic motion. It therefore is necessary to determine the excursion possible, as well as the power or forces available to control the hand. This excursion-force or force-length curve should be worked out for what is considered to be a minimum and should be calculated to the strength available in the weakest amputee, but the hand

mechanism also must be stressed for the forces exerted by the strongest amputee. Thus, extensive force studies are needed in order to establish the maximum and minimum limits of motion and forces available (7, 9, 10) Analysis of the resulting data shows that an arm amputee should be able to grasp with a force of at least 15 lb. objects of all sizes and geometrical shapes up to about 3 in. in diameter. Minimum anticipated available work is calculated to be 37.5 in.-lb. or  $1\frac{1}{2}$ in. of excursion with 25 lb. of force. This condition means that the designer should strive for an over-all output-to-input ratio of 0.6 for hand and control system.

Once the lower limits of the available motor input are established, it then becomes necessary to determine which hand function or functions this force is to provide. To do so requires a complete survey of hand biomechanics including detailed studies of the uses of the human hand, the finger forces necessary to accomplish myriad tasks, the frictional characteristics of the skin, exact finger attitudes, approach to the object to be grasped, and the stability of the grasp on all types of geometrical objects.

### **Prehension Patterns**

From fundamental time-and-motion studies, and through the transposition of certain habitual finger motions to another prehension pattern, it is found that the most effective, useful, and efficient grasp involves the action of the first and second fingers approaching and meeting the thumb at a converging angle (Figs. 1 and 2). The third and fourth fingers of the normal hand act as a resting shelf for holding a glass or other objects, as gliders when writing, and as reinforcing agents to the grasp. When their nerve sense has been removed, these fingers interfere with the normal approach of the first and second fingers. In the artificial hand, therefore, the third and fourth



Fig. 1. The APRL voluntary-closing hand and cosmetic glove, showing the "threejaw-chuck" prehension pattern. Courtesy Army Prosthetics Research Laboratory.

fingers are needed only for their cosmetic effect and should be designed to yield so as not to interfere with the approach of the "active" digits.

The output utility of the hand thus can be regarded as residing in the thumb and first and second fingers. The next problem is to determine how these digits may be activated to the best advantage.

#### **Design Tests**

It is necessary first, through studies with normals, to list the most common and necessary manipulations of the hand. These functions include such things as opening various types of door locks, dialing telephones, using eating utensils, writing, combing the hair, dressing, carrying objects, and many other everyday functions. When the most practical pattern or patterns of prehension have been determined, the designer is faced with the task of producing an artificial

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Fig. 2. Finger-thumb-palm orientation. The three-jaw-chuck pattern is so modified that the plane formed by the thumb and first and second fingers forms an angle of 15 deg. with the axis of the forearm. Such an arrangement provides the most effective approach at table height. Courtesy Artificial Limbs.

hand that embodies these basic characteristics. In order to evaluate the efficiency of design, an amputee equipped with such a prosthesis is given a test similar to the one used for normals.

Test results are discussed in the design conference, at which time hand structure, methods of conserving energy, and control movement are considered. Among the factors reviewed are the unit stresses on the hand and mechanism, exact attitudes of fixed phalangeal or knuckle angles for preventing ejection of the grasped object, finger position, stresses on operating links, cosmetic configuration of hand and cosmetic glove in all finger attitudes, and angle or plane of approach to an object. Other considerations include fixed angle of adduction and flexion, use of a fixed thumb as a registering point, resilience of the palmar surfaces of the fingers and thumb, locking characteristics for retention of grip without strain on the amputee, and minimum spring forces for returning the fingers to the open position and for retraction of the control cable or member through its housing or bearings.1

#### **Hand Sizes**

Considering the obective requirements already listed, the first important element of hand design is the establishment of hand sizes. Because the human hand varies greatly in size and shape from person to person and even within the same person, it is necessary to construct an analytical curve based upon anthropological studies in order to determine, through experience, the sizes requared to satisfy the amputee population (1, 2, 6, 8, 12).

No attempt is made here to enumerate all of the details involved in the design analysis needed to produce a satisfactory terminal device. Many factors, such as clothing, climate, industrial hazards, moisture absorption, exposure to salt water, toxicity, sensitivity, ease of maintenance, size-illusion factors, adaptability to changes, and psychological acceptance, require serious consideration.

It is agreed generally that five hand sizes provide a reasonable match for all amputees from the preschool child to the adult (Fig. 3). The five sizes permit manufacturers to provide a device at reasonable cost.

#### Models

Determination of the required dimensions is only one aspect of achieving the five hand sizes. The next step is the construction of the physical models so that not only size but also shape and skin texture may be examined visually to compare subjective impressions. From experience with commercially available voluntary-closing hands and with experi-

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Fig. 3. Prototypes of the five hand sizes required to satisfy the population from age four to maturity. Courtesy Army Prosthetics Research Laboratory.

mental models, it is believed that optimum cosmetic shape is obtained if the hand shells are cast from the corrected impressions of living models. The problem, then, is to find a suitable, living hand model with the required attributes of size, shape, texture, and detail.

Because the specified dimensions represent population averages, it would be fortuitous indeed to find living models whose hands had precisely the required dimensions in addition to the other appearance attributes. Fortunately, techniques have been developed for making necessary adjustments in both size and shape after the original impression has been taken. This simplifies considerably the task of finding the model. Once a model is found to have the desired texture and approximate size, gross size changes can be made by solvent extraction of plasticizer from plasticized polyvinyl chloride films. This process was worked out in the laboratories, and inert but accurate hands were made for optical appraisal by a large group of experts in the prosthetics field.

Corrections then are made and electroformed molds of such hands are constructed and reduced by the thickness of the cosmetic glove. This process gives the exterior configuration and dimension available for the operating mechanism. The molds are then cut on pre-established lines,

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again corrected for the mechanical considerations (by establishing pivot bosses for the mechanism, finger pivot bearings, stressing webs, and disconnects), assembled, tested for natural movement and coordination with a glove, and then used as patterns for the final castings at the foundry. The original molds from each of these hands are used as master molds, and duplicate or use molds are electroformed for production of the cosmetic or skinlike glove, thus assuring gloves that fit precisely the finished hand mechanism.

### **Finger Design**

Because the fingers comprise the operating portion of the hand, their structure and method of operation are of extreme importance. At the outset, it would seem that the natural pattern should be followed in the articulation of artificial fingers, but the mechanical complexities of fully articulated prosthetic fingers must be weighed against their functional stability in use. Because the finger is, in effect, a slender column, it presents a great lever disadvantage. To imitate each finger joint introduces excessive lateral instability. In addition, it is difficult to design an operating mechanism that will fit into so small a space and, at the same time, that will be rugged enough to withstand the stresses normally imposed on the fingers. Careful control of fixed knuckle angles lends greater strength, better lateral stability, and improved control of the prehensile pattern and confines finger movement to the base or largest portion of the finger column or at most to one joint distal to the metacarpophalangeal articulation. The palmar surfaces of the fingers and thumb should be padded to provide a resilient and contour-conforming grip. Resilient pads afford the amputee additional surface-contact area and hence increase the stability of grasp.

Although the normal thumb is mobile, contributing greatly to the



Fig. 4. The APRL No. 4C hand, now available commercially. The thumb assumes a fixed position, and the first and second fingers close upon it. The fourth and fifth digits are passive "floaters." Courtesy Army Prosthetics Research Laboratory.

versatility of the human hand, in the artificial hand a fixed-position thumb is most efficient (Fig. 4). It provides a registering point that prevents accidental displacement of an article, as is the case when the thumb also moves and the amputee must guess the point of contact in motion. Moreover, a fixed thumb permits the concentration of force in the first and second fingers, and it also eliminates complicated linkages between thumb and fingers.

#### **Two-Position Thumb**

Time-and-motion studies have demonstrated that a hand opening of approximately an inch and a half is required for about 90 percent of all common activities (4, 5, 13). An opening of three inches suffices for the remaining 10 percent. Because  $1\frac{1}{2}$  inches of control-cable excursion is all that can be allotted to operate the device, and because a ratio of control-cable travel to fingertip travel of 1:1 is desirable, a mechanism is needed that allows the amputee to set the thumb in either of two positions in order to accommodate larger objects. The two-position thumb (Fig. 5) is made possible through the use of a unidirectional alternator mechanism that permits the thumb to spring open when pressure is exerted on the dorsal side. The thumb can be reset by the same pressure, the inner position being marked by an audible click or other sensory



Fig. 5. The two-position thumb, set manually from either position to the other by application of pressure on the dorsal side. Inner position provides for objects up to  $1 \frac{1}{2}$  in. Outer position accommodates objects between  $1\frac{1}{2}$  and 3 in. Courtesy Artificial Limbs.

cue. Such a thumb can be set by pressing it against some part of the body, a table, or the like, and does not require the use of the other hand.

### FINGER-OPERATION SYSTEMS Voluntary-Opening

Two methods of obtaining finger operation currently are availablevoluntary-opening or voluntary-closing (3, 4, 5). In the voluntary-opening device, the amputee, using his motor control source, opens the fingers of the hand against the tension of a spring, and the spring, in turn, performs the clamping action in much the same manner as does a common spring clothespin. Such a device is simple to design, and its application to different tasks is accomplished by varying spring tension or by using multiple springs. If such a spring-loaded system satisfied the criteria for a truly efficient prosthesis. the task of the designer would be comparatively simple.

But the voluntary-opening device has disadvantages. It does not, for example, afford the amputee willful, graded prehension or control of fingertip pressure. The forces possible in the voluntary-opening device are limited strictly by the available spring tension. Moreover, there is a definite limit to the maximum pressure attainable, and full force on the control cable is required to overcome the spring tension whether a light or a heavy grip is desired. If spring tension is increased to permit even medium-heavy tasks, the forces reguired to operate the device are excessive for the average amputee. Delicate objects cannot be handled, and the device is unstable because the fingers tend to relax when the control cable is placed under tension accidentally. Another disadvantage found in this type of hand is the unnatural motion required for operation. That is, tension is required to open the fingers and relaxation provides the clamping action, motions just the reverse of those used in normals.

The best that can be done with the voluntary-opening mechanism is either to make the spring loading continuously variable or to utilize several springs in parallel with provisions for selecting one, two, or more springs for varying the finger pressures. In spite of these disadvantages, however, the voluntary-opening device serves well for the most seriously handicapped, for those who desire limited function, and where economy and simplicity are valued above function and efficiency.

#### Voluntary-Closing

In the voluntary-closing hand, the amputee, using his motor control, closes the device, and opening is effected by spring force. Hence, the prosthesis offers graduated, controlled fingertip pressures, a compatible or natural pattern of motion, and extreme stability of grasp. It can be used on the most delicate of fragile items and is capable of performing heavy tasks as well. At the same time, the force exerted by the amputee is related directly to the output forces desired.

In order to reverse the mechanical disadvantage of the fingers and to produce a 1:1 ratio of fingertip travel to input-control travel, thus obtaining a synchronous motion balance, such a hand should contain a force-trans-

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fer mechanism, such as gears, cams, or levers. A spring must be used in this type of hand to return the fingers to their open position and to withdraw the operating control to its starting position. This feature detracts somewhat from the over-all mechanical efficiency of the device, but if the spring is substantially linear in its characteristics it does not impair the amputee's efficiency.

Insofar as grip, approach, and operating characteristics are concerned, the voluntary-closing device performs efficiently. But unless a lock or clutch is incorporated, the device would then be carried in the open position, and the amputee would have to exert continuous pressure on the control system to maintain grasp. These two factors would make the hand unsightly or unnatural in appearance and awkward to use.

To eliminate both of these drawbacks, a clutch or brake mechanism must be installed so that the hand can be carried in a natural attitude and so that the grip can be maintained without undue strain. Such a clutch must be devoid of backlash, automatic in its braking action, and releasable at the same control pressure at which it was locked. In other words, the clutch must lock at the amputee's will and at a force necessary to retain the object grasped and must release at the same control tension in order to maintain complete control of the object during the unlocking phase, all of which must be done with the one prehension control cable. The method which has given the most success to date is based upon a cam-and-quadrant system. Relaxation of tension in the control cable from the energy source results in engagement of the cam regardless of the position of the fingers. Reapplication of tension in the cable dislodges the cam and frees the system.

#### The Reflex Hand

Although the voluntary-closing system probably is the best method for operating an artificial hand, improvements could be effected by combining its advantages with those of the voluntary-opening system. The normal hand usually is carried in a relaxed attitude, but when it is brought to the zone of approach, it opens by visual cue to receive the object and then closes upon it. On relinguishing the grip, the hand drops back to its normal, or relaxed, position.

This "reflex" action can be duplicated mechanically and could be incorporated into a "reflex hand" (Fig. 6). At the first impression of force on the control cable the fingers open rapidly and, by continuing the pull on the cable, close at the speed of cable travel. The "push-pull" action is made possible by a lever system that presents a relatively high mechanical disadvantage when opening the fingers and then transfers to an advantage lever in the closing motion. Owing to the transfer of lever characteristics, this system inherently provides a cue on reaching full opening. Thus, one continuous motion of the control cable opens the fingers from a relaxed to a full-open position and closes the fingers on the object approached. When the grip is relaxed, the fingers open to release the object and then return to the normal position.

The reflex hand would, therefore, give the amputee all of the advantages of the voluntary-closing device and, at the same time, have some of the advantages of the voluntary-opening device. Because of the "powered" opening and closing, it would also eliminate the major portion of the spring return, thus increasing the efficiency ratio of input to output force.

In the reflex hand, as in the voluntary-closing one, a clutch is required to eliminate the need for continuous pressure, and it should be entirely automatic. If a one-motion cycle is to be attained, the clutch must engage during the closing operation and then retain the maximum impressed grip force while the cable force is reduced. It would not be too difficult a task

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Fig. 6. The principle of the reflex hand. First  $\frac{1}{4}$  in. of excursion in the control cable opens the hand to the full  $\frac{1}{2}$  in. Further pull on the cable closes the hand at a 1:1 ratio of fingertip travel to cable travel. Thus, after  $\frac{1}{2}$  in. of cable travel, the hand is fully closed again. The difference between the  $\frac{1}{2}$  in. total excursion and the ideal  $\frac{1}{2}$  in. may be compensated for during the closing cycle by lineating mechanisms that give  $\frac{1}{4}$  in. actual cable travel. Upon release of tension on the cable, the action goes through the reverse cycle. The hand first opens fully (at a ratio of 1:1). Last  $\frac{1}{4}$  in. of cable excursion allows hand to return to closed or "rest" position. The excursion relationships suggested here are approximations; they may need minor modification on the basis of actual experience with test wearers. Courtesy Artificial Limbs.

for the amputee to retain two or three pounds of tension on the control cable.

If, therefore, the clutch could retain the full grip of fifteen to thirty pounds of fingertip pressure, with only a two-pound force on the cable, the amputee would not have to exert maximum continuous pressure. At this point some sensory signal must be relayed to the amputee to warn him that further relaxation of controlcable force will release the object. Passing beyond this cue would release the clutch and return the fingers to their normal or starting position. Details of such a clutch design remain to be worked out.

To make the reflex mechanism versatile and adaptable, it should be a packaged adjustable unit which, through its adjustment features, can be used universally in all hands from the smallest to the largest. Standardization is perhaps the easiest feature to achieve because, if the clutching unit itself can be designed so that its case fits the smallest hand, adjustable lever shoes or arms can be attached externally to supply the greater lever advantage needed in larger hand sizes.

Other mechanisms available currently can be used in the construction of an efficient reflex hand. Among them is a force multiplier (Fig. 7) that can be used to give the greatest impression of tip force at the time of contact or impact with the object to be grasped. Also available are various lineating mechanisms that can be used to make the force response consistent over the entire range of finger motion.



Fig. 7. One type of force multiplier. The tension in the coil spring is such that the spring is not overridden when there is applied to the control cable enough force to operate the fingers in the no-load condition. Thus, as long as the fingers are not in contact with an object, the ratio of cable travel on the harness side to that on the terminal-device side is 1:1, the lever arms maintaining their relative positions with respect to each other (top). When the finger tips meet a resistance of 3 lb., continued excursion of the control cable on the harness side locks the lever traverse to the base section of the multiplier, and force is then transmitted through the dual levers at a mechanical advantage to increase force at the fingers (bottom).

### THE FUTURE

In light of present knowledge of fundamental movements, grasp patterns, and sources of control now established as useful to the amputee, future research in terminal devices appears to be well defined. Of immediate consequence in design is the problem of sensory feedback. Needed in this area of study are definite cues that indicate fingertip pressures, finger openings, and the position of the hand in rotation. Such cues would be invaluable to the amputee, enabling him to achieve more casual and lifelike movements.

Some devices have been tried with limited success, and others have been discarded. Among feedback mechanisms are the elementary devices consisting of tone-frequency electric buzzers and hydrostatic or hydraulic bladders feeding to a nerve center existing on the body. Direct-pressure systems also are worthy of consideration as are the more complicated types of electronic mechanisms capable of picking up nerve impulses or of feeding electronic impulses into a sensitive area at various frequencies or concentrations. It also is possible to build into the harness and control system some of the basic cue mechanisms and, as illustrated by the change of mechanical forces in the reflex hand, some cues can be inherent in the device itself.

Another area of improvement is the skeletal structure of the hand under the cosmetic glove, the object being to give the device a "feel" comparable to that found in the normal. In light of structural requirements for hands, the need to replace or interchange cosmetic gloves easily, the space limitations within the handshells for the relatively complex mechanism, and the lack of suitable component materials for greater wear resistance having affinity for both metal and cosmetic gloves, this problem is not an elementary one. Rather, it is one requiring a great deal of development work and study. This phase of future investigation should, of course, be coordinated with the construction of an anatomical arm. Hence, it becomes an item of materials research.

Although the complexities of dexterous movement present in the normal hand never will be approached in a mass-produced mechanical structure, it is believed that a reasonable facsimile of the lost extremity eventually can be constructed. Such a device will return to the amputee at least the functional requirements necessary for holding his place in society in competition with normals without handicapping him, except in very narrow areas of employment where the hands are relied upon for their extreme dexterity and sense of feel. The highly sensitive nerve areas of the normal hand cannot be duplicated, nor can the complex manipulation of the hand be duplicated without requiring such a high degree of

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concentration that the over-all efficiency is impaired seriously. Too, consideration of wear, abuse, maintenance, and the amputee's ability to operate effectively must always be foremost in the design of active replicas of the human hand.

Continuing research and development will lead to more sensitive, efficient, and natural-appearing artificial hands. But it must be stressed that the interpolations of studies and findings of the past decade will require additional time before they can be translated into sound, workable reproductions of the human hand.

### Literature Cited

- 1. Birdsell, Joseph B., A survey to size the 4-B prosthetic hand, Department of Engineering, University of California (Los Angeles), Special Technical Report No. 16, August 1950.
- 2. DeFries, M. G., Sizing of cosmetic hands to fit the child and adult amputee, Army Prosthetics Research Laboratory, Technical Report No. 5441, September 1954.
- 3. Fletcher, Maurice J., New developments in hands and hooks, Chapter 8 in Klopsteg and Wilson's Human limbs and their substitutes, McGraw-Hill, New York, 1954.
- 4. Fletcher, Maurice J., What makes for a good terminal device? J. OALMA, p. 12 (July 1951).
- 5. Fletcher, Maurice J., and Fred Leonard, The principles of artificial-hand design, Artificial Limbs, 2(2): (May 1955).
- 6. Gottlieb, M., The sizing of the child's prosthetic hand, Department of Engineering, University California (Los Angeles), Memorandum Report No. 19, March 1954.
- Keller, A. D., C. L. Taylor, and V. Zahm, Studies to determine the functional requirements for hand and arm prosthesis, Department of Engineering, University

of California (Los Angeles) 1947.

- 8. Simmons, Katherine, *Physical* growth and development, Monograph of the Society for Research in Child Development, Vol. 9, No. 1, 1944.
- 9. Taylor, Craig L., The biomechanics of the normal and of the amputated upper extremity, Chapter 7 in Klopsteg and Wilson's Human limbs and their substitutes, McGraw-Hill, New York, 1954.
- Taylor, C. L., and A. S. Blaschke, *A method for kinematic analysis*  of the shoulder, arm and hand complex, human engineering, An- nals N. Y. Acad. Sci., 51:1123 (1951).
- 11. University of California (Los Angeles), Department of Engineering Manual of upper extremity prosthetics, R. Deane Aylesworth, ed., 1952.
- Wallis, R. S., How children grow, University of Iowa Studies in Child Welfare, Vol. 5, No. 1, 1931.
- Wilson, A. Bennett, Jr., The APRL terminal devices, Orthop. & Pros. Appl. J., 6 (1):17 (March 1952).

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## TO THE LADIES: from

### **OALMA's Woman's Auxiliary**

Our National Assembly in New Orleans at the Jung Hotel October 16-19, 1955 is drawing near and we hope all of you are planning to accompany your husbands. We should have the largest attendance ever, as this convention promises to be the most interesting of any held up to this date. New Orleans in itself is such a popular tourist attraction that we're looking forward to the sightseeing there. To those ladies who have never attended one of our conventions, let me assure you that the officers will see that you become acquainted with the other members. You will be assigned a "big sister" to accompany you on our tours and make you feel at home with the group.

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Our program is not complete as yet but we feel confident it will be so good that no one will want to miss any part of it. So come all to New Orleans in October.

Your husbands have received other announcements of the meeting with registration forms, etc. If any of the ladies would like more information concerning the Assembly, I will be most happy to answer you. Write to me at 4534 No. Newhall Street, Milwaukee 11, Wisconsin.

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### PHYSICAL THERAPY AFTER AMPUTATION: THE TREATMENT OF THE UNILATERAL LOWER EXTREMITY AMPUTEE

### By Margaret Bryce

(Published by the University of Wisconsin Press; Madison, Wisconsin; 1954; 93 pages, 14 drawings; \$1.50)

Reviewed by Robert N. Bidwell, Madison, Wisconsin.

This small but valuable book is written primarily for physical therapists who are dealing with the training of lower extremity amputees, and for students of physical therapy. It describes the exercise techniques used in this training. The description of different types of prostheses has been deliberately limited. The author feels, and correctly so, that this is the province of the prosthetist; however, she has included sufficient details so that the physical therapist can cooperate intelligently with the prosthetist. The book can also serve to familarize the prosthetist with the basic techniques used by the physical therapist in her exercise program.

Many prosthetists will find this book valuable to give to physicians to show them that the fitting of a prosthesis and the training of the patient in its use are highly skilled procedures. The author emphasizes the team approach. There are some points in the book such as the placement of the knee joint, which are a matter of disagreement. However, the author presents the arguments for her opinion clearly, and these points are of minor importance in the exercise programs which are described. In this reviewer's opinion this book can serve another purpose. The prosthetist in cooperation with the prescribing physician and the physical therapist, might well place a copy in the hand of his patients. It will help the patients understand better what the program is all about. The book is inter-leaved with white pages for student notes, which could be used to write in special instructions for the individual patient.

### OPERATIVE ORTHOPEDIC CLINICS

By Lewis Cozen, M.D., F.A.C.S. and Alvia Brockway, M.D. in collaboration with Paul E. McMaster, M.D., F.A.C.S. Published by J. B. Lippincott Company, Philadelphia and Montreal, 1955. 329 pages. \$10.

Reviewed by J. Fred Quisenberry, Partner, Alpha Orthopedic Appliance Company, Los Angeles.

In the course of the Orthotist's or Prosthetist's activities he is called upon to design and fabricate various types of equipment to be used in conjunction with the human body. In many instances the use of the appliance is preceded by a surgical operation. As the measurements for the appliance are being taken, the Orthotist or Prosthetist sees only the remaining scar tissue. Often he wishes he could have been present in the operating room to ascertain how the incision was made and how the various other procedures involved in the operation were accomplished.

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This new book is written by Lewis Cozen, M.D., F.A.C.S., Assistant Professor of Orthopedic Surgery, College of Medical Evangelists, Los Angeles and Alvia Brockway, M.D., Chief of Staff of the Orthopedic Hospital, Los Angeles. It will be a valuable addition to the library of any Orthopedic or Prosthetic Institute or facility.

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### CODE OF ETHICS FOR THE ARTIFICIAL LIMB AND BRACE PROFESSION

The Federal Trade Commission has approved fair trade practices for the field of artificial limbs and for orthopedic appliances. Both codes have been adopted in their entirety by the American Board for Certification as a guide for the Certified Prosthetist and Orthotist. The full text of the Codes may be obtained by application to the American Board for Certification Headquarters.

The following digest of the rules is printed for ready reference.

#### It is an unfair trade practice:

- (1) To deceive purchasers or prospective purchasers as to any of the qualities of a prosthetic or orthopedic appliance, or to mislead purchasers or prospective purchasers in respect to the service of such appliances.
- (2) To infer an artificial limb is equivalent or nearly equivalent to the human limb, complies with any government specifications, or has the approval of a government agency unless such be wholly true or non-deceptive.
- (3) To fail to disclose to a purchaser, prior to his purchase, of a prosthetic appliance, that the degree of usefulness and benefit will be substantially dependent upon many factors, such as the character of the amputation, condition of the stump, state of health, and diligence in accustoming oneself to its use.
- (4) To promise that any industry product will be made to fit unless such promise is made in good faith and the industry member is possessed of the requisite competence to assure his ability to fulfill such guarantee. A prosthetic device is not to be considered as fitting or an orthopedic appliance unless properly shaped for the body member to which it is applied, and in proper alignment and conformity with the physique of the person to wear such a product, and affords the optimum of comfort and use on the part of the wearer.
- (5) To deceive anyone as to his authority to represent and make commitments in behalf of an industry member unless such be fully true.
- (6) To use any testimonial or use any picture which is misleading or deceptive in any respect.
- (7) To demonstrate any appliance in a manner having the tendency or effect of creating a false impression as to the actual benefits that may be reasonably expected from it.
- (8) To use any guarantee which is false or misleading.
- (9) To represent that any appliance conforms to a standard when such is not the fact.

- (10) To publish any false statements as to financial conditions relative to contracts for purchase of appliances.
- (11) To engage in any defamation of competitors or in any way to disparage competitors' products, prices, or services.
- (12) To use the term "free" to describe or refer to any industry product which is not actually given to the purchaser without cost.
- (13) To wilfully entice away employees of competitors, with the purpose of injuring, destroying or preventing competition.
- (14) To take part in any concerted action with other members of the industry to wilfully fix prices.
- (15) To promote the sale of any appliance to any person who can not be expected to obtain reasonable benefit from such appliance.
- (16) To refrain from giving every assistance to doctors before and after amputation or crippling condition, or to fail to do everything possible to promote mutual trust and confidence between the industry and the members of the medical profession.
- (17) To undertake to supply an artificial limb by nail-order specifications without personal fitting thereof unless conditions are such which make an exception desirable, and in any case, no misrepresentation shall be made as to fit.
- (18) To unduly exploit features of appliances less important than proper fit and alignment.
- (19) To fail to recognize that the interest of the amputee and the handicapped is the first concern of this craft and therefore any failure to make available to all of its members and the general public any improved technique that may be used as to making, fitting, aligning or servicing of industry products shall be an unfair trade practice.
- (20) To pay anything of value to any doctor for the purpose of obtaining a referral of a patient by the doctor to the industry member.

Further, the industry desires to be an active and cooperative factor in all progressive developments of improved techniques that will contribute to the welfare and comfort of all who wear its products.