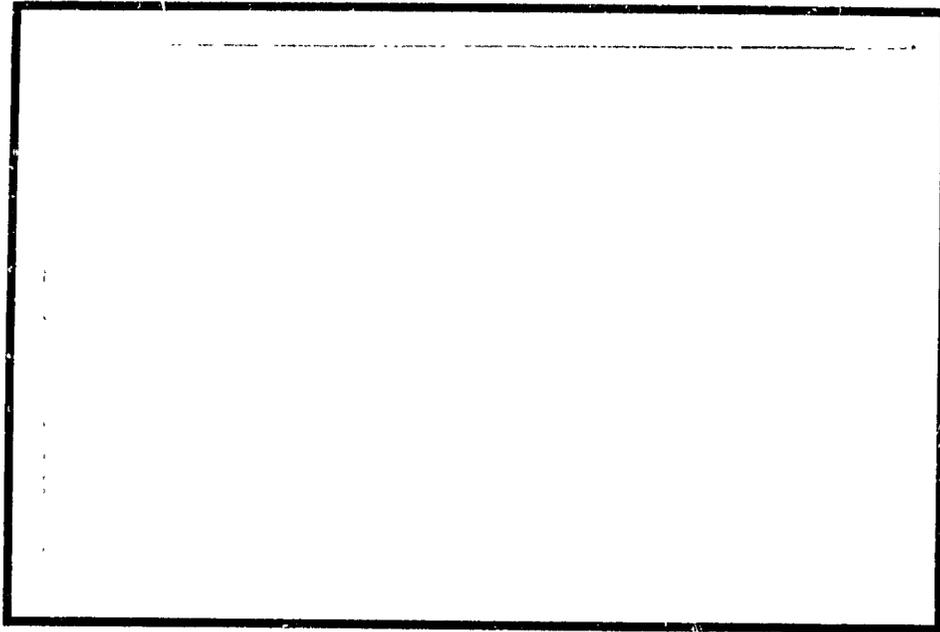


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PRITECH

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ETHIOPIAN PROSTHETICS AND
ORTHOTICS NEEDS ASSESSMENT

A Report Prepared By PRITECH Consultant:
TIMOTHY B. STAATS

During The Period:
JANUARY 11 - 23, 1991

TECHNOLOGIES FOR PRIMARY HEALTH CARE (PRITECH) PROJECT
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February 4, 1991

To: Pritech (703)-516-2555
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&
Allen Randlov (703)-875-4684
US AID Prosthetics Specialist
ST/H Room 709 SA-18
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From: Timothy B. Staats
Director, UCLA Prosthetics Orthotics Education
Program
Room 22-46 Rehabilitation Center
1000 Veteran Avenue
Los Angeles, CA 90024 (213)-825-6341

**Re: Final Report: Ethiopian Prosthetics and Orthotics
Needs Assessment.**

I. Summary Description of Scope of Work

A field assessment of prosthetics, orthotics, other rehabilitation services and related activities was conducted at the request of US-AID during the period of January 11 through January 23. The assessment reviewed civilian and governmental capabilities in Addis Ababa, Debre Zeit, Nazereth, Harer, and Hartesheik (see map). These regions comprise service areas in Ethiopia that were said to be representative and since portions of Ethiopia are actively involved in civil war and with the initiation of the War in the Persian Gulf, certain travel restrictions were imposed. Nevertheless, it was possible to assess a wide range of personnel, services, and fabrication technologies in use in Ethiopia. There were more or less modern prosthetics facilities and

equipment in Addis Ababa at one end of a technology continuum and virtual non-existence of services in a refugee camp at the Somalia-Ethiopia border village of Harteshiek. The number of amputees, polio, and paralyzed people seen during the assessment was staggering.

II. Purpose of the Project

The assignment during this visit was to assist with the assessment of prosthetics and orthotics and other rehabilitation programs in Ethiopia. This included visiting rehabilitation centers in Addis Ababa and other cities. We evaluated facilities, equipment, staff and supplies. The evaluation assessed the appropriateness and quality of work being done. After the assessment recommendations would be made how rehabilitation might be improved including training of personnel, equipment and supply needs, and changes in technology. Comments on related services such as surgical techniques, physical therapy needs, and related rehabilitation services were requested. Finally, recommendations of how and through which organization US-AID can best help increase the quantity and quality of rehabilitation services for civilians in Ethiopia were requested.

III. Methodology

Interviews and on-site observations were conducted beginning January 14 and continuing through January 23. Most interviews lasted about two hours and site visits lasted up to four hours. Agencies interviewed included Ethiopian Government officials from the Rehabilitation Agency, the Ethiopian Red Cross, non-governmental organizations, such as the International Committee of the Red Cross (ICRC); Handicap International (HI), and other individuals with knowledge of existing rehabilitation services.

IV. Summary of Observations

- January 11 - 12 Travel Los Angeles to Washington D.C.
to Frankfurt, Germany to Addis Ababa,
Ethiopia.
- January 13 Organize meetings and generally recover trip
- January 14 Meetings at US Embassy, US-AID offices.
Ethiopian Red Cross
Handicap International
International Labor Organization
Visited Black Lion Hospital
- January 15 Visited Offices of Rehabilitation Agency
Visited Prosthetics Orthotics Center (POC)
Traveled by Air to Dire Dawa.
- January 16 Visited Harar Prosthetics Orthotics Center
Travelled to Jijaga, Ethiopia
Visited UN refugee headquarters
- January 17 Visited Hartishiek Refugee Camp near Somalia
Returned to Harar for evening.
- January 18 Traveled to Dire Dawa.
Traveled by Air to Addis Ababa.
Returned to US-AID
- January 19-20 Meetings with Allen Randlov - Weekend.
- January 21 Visited Debre Zeit Heroes Center
Orthopedic Workshop at Nazereth
Visited amputee in rural village near
Nazereth
- January 22 Visited Alert Leprosy Center
Visited Cheshire House Polio Center
Traveled by Air - Left Addis Ababa 11:50PM
- January 23 Arrived Los Angeles 7:30 PM

V. Findings

The findings will be discussed under headings of:

- A. Amputations and Prosthetics
- B. Polio, Orthotics, Wheelchairs & Assistive Aids.
- C. Physical Therapy

A. Amputations and Prosthetics

1. Amputations and Amputation surgery

From this brief assessment amputations were found to be a common problem in Ethiopia. Estimating the total Ethiopian population at 45 million people, a rough approximation of numbers of amputees in Ethiopia can be estimated at 90,000 people or about 2 amputees per 100,000 population. From conversations with physicians at Black Lion Hospital and medical personnel at refugee camps the primary cause of amputation was war injuries, accidents and vascular disease.

Of the perhaps 200 amputees actually seen, about 50% were above knee amputations, 45% were below the knee amputees and the remaining 5% were upper extremity amputees and other lower extremity amputation levels. The numbers of civilian vs. soldier amputees could not be determined. However, the age and male gender of the majority amputees would seem to indicate that many were probably war injuries. Many traumatic amputations occur in and around Addis Ababa as a result of traffic accidents. The reason amputation is frequently seen rather than lesser injuries both in war and traumatic cases appears to be due to long delays in transporting injured to hospitals and inadequate availability of surgical personnel, facilities and material to handle the volume of patients.

The Black Lion Hospital in Addis Ababa was supposedly one of the better hospital trauma units. Observations found it to be well below sub-standard, filthy, and poorly equipped. There is only one orthopedic surgeon at this location, who is responsible for about 130 beds. The Hartesheik refugee camp hospital conditions were considerably worse. Two hospital wards were located in an adobe room. It seemed that surgery was performed in Harar and patients were transported back to Hartesheik camp for recovery. There may have been surgical facilities at Hartesheik but they were not seen. The quality of amputation surgery at all locations visited appeared quite good. Even in the Hartesheik refugee camp, where 20 - 30 amputee subjects were examined, the residual limbs were well formed, appeared to have properly cut bones, and were well healed.

2. Prosthetics in Ethiopia

a. Prosthetists

Counting all trained personnel who actually fabricate artificial limbs and work directly with amputees, there can be no more than a maximum of 30 prosthetists in Ethiopia. The distinction between trained personnel and lesser trained interns would reduce the number of true prosthetists to perhaps one-half that number, and the expertise of the best prosthetists appeared to be average at best. There is presently no formal P & O training program in Ethiopia, although many prosthetists have previously received training through the World Rehabilitation Fund, International Red Cross, and Handicap International programs. Fitting and fabrication techniques used reflect the era and quality of teaching provided and is significant in relation to need for upgraded training.

There is a tremendous need for additional Ethiopian prosthetists, but there is little money available to pay their salaries. Government resources for this specific purpose appear to be stretched to the limit, even at the Heroes Center (in Debre Zeit) where the best prosthetics technology was seen.

There are 1500 to 2000 (maximum) prostheses made per year in Ethiopia. As a rule of thumb, each prosthetist working alone can make about 1 1/2 to 2 prosthesis per week. Therefore, each prosthetists in Ethiopia must make 66 prosthesis per year, some doing more than others. This is a very optimistic estimation of the probable production of each prosthetist considering present pay scales, training levels, materials problems, and other factors. Furthermore, if there are 90,000 amputees in Ethiopia, which may also be a conservative estimation, then a vast majority of amputees will never see a prosthetist. This is a chronic problem of national importance.

b. Prosthesis Socket Design and Alignment

At all centers visited, there was no indication of anything but rudimentary patellar tendon bearing below-knee sockets and crude quadrilateral above-knee socket design. There is a limited understanding of socket shape, socket problem analysis, and no apparent use of mechanical alignment devices. Alignment of prostheses was done by sawing the prosthesis in two pieces and wedging it into a new position. The prosthetic alignment results were generally good in amputees seen walking, but took longer than necessary. Simple questions about alignment could not be answered. Considering many limbs examined were in unfinished stages, the prosthetists have demonstrated at least an aesthetic appreciation for prosthetic alignment and a concern for patient comfort. These findings would

coincide with the level of prosthetic "socketology" seen in Ethiopia. Socket designs have improved greatly in the USA during the past ten years and this technology could be transferred in a relatively short term training program. This training is typically not available outside the USA.

c. Prosthesis Fabrication Techniques

It is important that prosthetic fabrication and prosthetic component production be separated. These are separate although related issues. There are several basic ways or technologies amputees are provided limbs or treated in Ethiopia.

1. Crutches - Since most amputees are waiting for prosthesis, most walk using crutches. These crutches are either homemade or in most cases made of durable steel design which are mass produced in at least four locations.

2. "Appropriate Technology" - The Orthopedic Workshop at Nazereth was developed by Handicap International. The apparent philosophy at this and other H.I. locations is to make so called "appropriate technology" artificial limbs using locally available materials and simple low cost tools and techniques. This "romantic" philosophical approach sounds good but fails generally for a number of reasons in Ethiopia. The prostheses made in this manner are typically fabricated using leather, wood and metal straps. While these materials are available in Ethiopia, they are expensive and generally in short supply. In reality this has meant bringing these supplies from Addis Ababa which is logistically not that different from importing materials. The prosthetists using this primitive technology complained of the time it takes to make even simple wood crutches or leather, wood, and metal peg-legs. A pair of wood crutches may take 3 days and a

below-knee prosthesis well over a week. They are aware of more advanced plastic designs from the Heroes Center and the POC in Addis Ababa and want to learn these more efficient and durable techniques. They have the workshop space and electricity which would permit them to upgrade very easily were materials and training available. They are not pleased with the present level of P & O devices they produce.

It is unfortunate that this same "appropriate technology" philosophical approach to prosthetics is being planned for the refugee camp at Hartesheik. They will have to import materials great distances to the camp to make prostheses of very poor quality. The Handicap International people at the refugee camp understand this flaw in their own philosophy but have received funding commitment from the UN for their project and are building a workshop at this location.

3. Laminated Plastic Prostheses - The third tier of prosthetics fabrication technology in Ethiopia involves the use of laminated polyester resin (thermosetting resins) reinforced with nylon and fiberglass. This is now the world standard for prosthetics and should probably be considered the average level of practice standard for Ethiopia. These limbs were seen in Addis Ababa at the POC, at the Heroes Center in Debre Ziet, in Harar at the Harar Workshop, and amputees wearing these prostheses were seen at the Hartishiek refugee camp and in a village beyond Nazereth outside of Addis Ababa.

The quality of these plastic laminates seen was average to below-average. Some poor fabrication technique was seen and as was improper use of reinforcement materials demonstrated only limited knowledge of strength requirements necessary for Ethiopia's difficult terrain. It was also reported that at times it was difficult to obtain plastic resins and

other supplies, but it was no worse a problem than obtaining other supplies such as leather, wood, and metal.

One critical element related to using polyester resin laminates is that the resins have a shelf-life which is effected by heat. If the shipment of liquid plastic resins were to sit in the sun on a shipping dock for any extended length of time the resins could be expected to spoil or partially cure. The resins seen in use were no different than in the USA. The proper handling and safety procedures for use with polyester resin were not carefully observed, but this problem also occurs in the US. The major criticism of the polyester resin sockets I saw relate to inadequate training and understanding of the importance of laminate reinforcement and lamination perfection for maximum strength. It should be possible to make sockets virtually indestructible if properly fabricated. Again, this is a separate issue from socket shape.

Use of soft socket liners was not seen. These are soft linings which are used inside the laminated socket, between the stump and the hard socket. Since the socket design or "socketology" in Ethiopia is rudimentary, the use of soft socket liners would greatly enhance the comfort of amputees by padding or masking poor fitting techniques. If good socketology were taught in conjunction with the use of soft liners good comfort and function could be afforded.

Generally, the finished prosthetic legs seen durable and were looked of acceptable enough comfort to be worn on a regular basis by the patients interviewed. One prosthetic leg seen in the village outside of Nazereth was cracked. However, it was determined that it had only recently cracked after seven years of wear. This level of durability is well within the international standards of reasonable expected life of a

prostheses. This particular patient continued to wear the limb even though cracked because it was still more comfortable than his Handicap International limb.

4. Vacuum-Formed Thermoplastic Limbs - A fourth technology for prosthesis fabrication has recently been introduced at the Heroes Center in Debre Zeit. This involved the use of thermoplastic materials or sheets of plastics that are heated in a large oven until molten. The molten plastic is vacuum-formed around a plaster model of the stump. This technique was also seen in Harar a few days earlier but was worrisome at that time because of the crude way technique had been used. Discussions with the Australian ICRC prosthetist at the Heroes Center responsible for this project caused a reconsideration and a positive view towards the merits of this technique.

Thermoplastic thermoformed prosthetic limbs are used extensively in the USA with good results. One area of concern is that these plastics, if improperly used are prone to catastrophic failure. Shrinkage can also be a problem. The technique being introduced at the Heroes Center in Debre Zeit was developed or adapted for ICRC use in Afghanistan and has been in use for two years. They claim to have worked the problems out of their system. The one of two completed limbs looked durable and had socketology which reflected the better training of the Australian prosthetist who fabricated the legs.

It was pointed out that the thermoplastics sheets have no shelf-life and can be imported by air or land. Liquid resins being flammable, cannot be shipped by air. These facts, transportability and shelf-life make this technology very appealing and important to consider. In terms of fabrication, electricity, ovens and vacuum sources are required and all of these requirements are present in the existing Ethiopian P & O centers in

Harar, POC, Alert, and Heroes Center. The Ethiopian prosthetists are very creative and could, if given the training, rapidly adapt to this fabrication technology.

It would appear that for the present laminated resin sockets are the standard of comparison, the vacuum-formed thermoplastic sockets are somewhat newer and above this technology level, and the so called "appropriate technology" limbs are unfortunately inappropriate for Ethiopia.

d. Prosthetics Component Manufacturing

There are at least two centers, POC and Heroes that are capable of mass producing knee components and foot components of consistent quality and quantity to meet the present production needs of the Ethiopian prosthetists. While there are intermittent problems with obtaining wood and metal needed for manufacturing, the existing heavy machinery is good if not excellent quality and is not being used to the limits of its production volume. There is, however, no apparent reason at this time to produce more component parts because the number of prosthetists in Ethiopia cannot be increased, therefore limiting the number of prostheses that can be produced will be limited.

The component designs used, while not sophisticated, were reported to be durable and any problems with component breakage seemed to have been worked out. Many amputees were seen wearing and using foot and knee components quite satisfactorily. The Knee mechanisms were somewhat heavy and had no swing-phase control, but realistically, were probably suited to the no-nonsense durability requirements of Ethiopia, even in urban areas. The feet were lightweight, and functioned quite acceptably. They were made of local materials and capable of being exposed to direct sunlight and weather without ill effects.

There was some discussion about the "Jaipur foot" being rejected in Ethiopia because it was not a "barefoot" society, even in the refugee camps! This was somewhat of a surprise for a first time visitor to Ethiopia. Sandals and shoes are normal and in fact thousands of shoe-shine boys earn their living shining shoes, even in remote small towns such as Jijaga near Hartishiek. There are prosthetic component improvements that could be introduced, but this is not a high priority from my point of view.

B. Polio, Paralyzed people, Orthotics, Wheelchairs & Assistive Aids.

1. Polio

Polio is probably the single biggest cause of paralytic conditions leading to the need for orthoses or other assistive devices in Ethiopia. During the short assessment visit to Ethiopia literally thousands of cases were observed in all age groups and genders. Polio is a blight on Ethiopia. There are certainly other causes of paralysis, but they must pale in comparison to the problem of polio.

2. Paralyzed People

Paraplegia and Quadriplegic patients were seen in great numbers at the Heroes Center in Debre Zeit. It was reported that of 1500 beds, that 970 were occupied by more or less permanent residents with severe paralysis. While the Heroes Center is theoretically for wounded soldiers it was obvious that some cases were polio. It was also obvious that not all cases were soldiers.

3. Orthotics.

The Orthotics or brace work seen during the assessment was limited. There was work being done at Harar, POC, Heroes Center, and Cheshire Home for Children. "Appropriate Technology" orthotics work was being done at Nazereth. I did not see any prefabricated orthotic components or any components made from lightweight aluminum. The orthotics components were durable but frankly crude. Parts were made of steel resulting in braces that were quite heavy. The theoretical design of the orthotics devices was quite good. Braces were well-contoured to tracings and leather work used to cover the steel was satisfactory. Quantity and availability seemed to be a big problem. At all locations orthotics seemed to take second place to prosthetics except at Cheshire Home which specializes in children with polio.

At Cheshire Home there are five or six orthotists and technicians who were extremely busy. One might conclude that as with prosthetics and prosthetists, the number of orthotists in Ethiopia are limited by the money available to pay their salaries and the non-existence of any formal training program. A limited number of orthotists had been sent to and trained in Moshe, Tanzania. Some crude thermoformed plastic orthotics work was being attempted at POC. This technology would greatly speed up production at all centers fabricating orthoses.

3. Wheelchairs

Wheelchairs were manufactured in limited numbers at POC and Heroes Center. As with orthotics components, the wheelchairs were of steel construction. Some of the wheel bearings and probably the wheels were sub-contracted at a factory outside these centers. The wheelchairs were consistent in quality, were heavy, but

appeared to be durable. Ethiopia is a terrible place to use a wheelchair. Even in Addis Ababa the rolling surfaces that are usably smooth are limited to main roads, and these are none too smooth. Accessibility to buildings and curb-cuts, if in existence, must have occurred by accident. In rural areas, rough roads and paths make negotiating in a wheelchair virtually impossible for anyone but the most daring, and then with the help of some friends. This may be the reason that many of the paralyzed stay at the grounds of Heroes Center where pavement is available. Estimated annual production of wheelchairs may be no more than 200 to 250 per year based on production figures stated at POC and Heroes.

4. Assistive Devices and Aids

Crutches and canes made of wood and/or steel are mass produced in large quantities, probably in the 1000's. The steel crutches in particular were quite sturdy and acceptable for the rough terrain in Ethiopia. Wood canes are mass produced on the same machines used to make prosthetic feet and knee components. At POC the majority of workers making canes and shoes were disabled. Shoes of good quality were being manufactured at several locations.

III. Physical Therapy

There was a great deal of interest in and training of physical therapists. Training programs were visited at POC and at the Hartishiek refugee camp. These programs had limited treatment modalities available and relied instead on therapeutic exercise techniques. At the refugee camp, an American therapist was diligently teaching a class of about 20 physical therapists or rehabilitation technician students to go into the camps to identify polio and other problems. They would teach parents how to care for their children and to prevent further physical deformities. This appeared to be a

very worthwhile project. At all centers the physical therapy areas had parallel bars and treatment tables and were generally clean and well organized. There were requests and obvious need for additional equipment at all centers. It seemed that a capability to train PTs had been established by NGOs. The future of these programs after the NGOs leave Ethiopia could not be determined.

VI. Main Conclusions

A. The Problem - The need for prosthetics and orthotics services in Ethiopia is extensive and chronic. There is no short term solutions to solving the massive logistical problem of providing prosthetics and orthotics services. It will take a long term commitment of resources and personnel to address the problem.

B. Governmental - The Rehabilitation Agency of the Ethiopia Government will be the main supporter of prosthetics and orthotics activities in the future. It appears that they have the leadership, interest and the vision for a national plan for rehabilitation of their disabled population. The Rehabilitation Agency is the primary employer of prosthetists and orthotists. Therefore the number of prosthetists and orthotists in Ethiopia will be dependent upon the financial resources allocated to this service.

C. Non-Governmental Organizations - Agencies such as the International Red Cross and Handicap International are presently providing technical and organizational assistance to the Ethiopia prosthetics and orthotics services. This assistance cannot be expected to continue over the long term or to have a major impact on prosthetics and orthotics services, i.e. the actual number of prostheses and orthoses

manufactured in a years time. Other smaller groups such as ALERT (the Leprosy Center) and Cheshire Home (the polio center for Children) are essentially small players at this time and will probably not have an impact on a national scale on either amputees or paralytic people.

D. Amputees and Brace Wearers - The numbers of amputees may be as high as 90,000 - 100,000 people. The numbers of people needing braces (orthoses) may be ten times greater than that number. If 1500 prostheses have been fabricated each year during the past five years only a fraction of all Ethiopian amputees have been fitted and the first group of amputees fitted would now be ready for new prostheses. These re-fittings must be added to the existing case loads, along with new amputees, and along with the existing long list of amputees waiting for limbs. The problem of amputees needing prostheses is truly of a huge magnitude. The numbers of people needing braces is so large as to make estimation impossible. The numbers of these potential candidates for limbs and braces more than justifies any expenditure for training of more prosthetists and orthotists as well as the creation of more extensive workshop facilities.

E. Existing Manpower - The existing manpower pool of prosthetists and orthotists seems to be working diligently within the constraints of available material and equipment. The problem of adequate and stable salary for prosthetists and orthotists may be helped somewhat by the apparent establishment of new pay-scales by the Ethiopian Rehabilitation Agency. This could not be officially documented. The number of prosthetists and orthotists in Ethiopia is directly proportional to the number of devices that can be produced. If more

devices are needed, more personnel must be trained and salaried.

F. Training of Manpower - Present training of rehabilitation personnel seems to be limited to Physical Therapy. The training of new prosthetists and orthotists if presently done at all, is done at minimal levels using apprenticeships. There are apparently plans for creating a prosthetics and orthotics school but it seems beyond the scope of activities the ICRC wants to be involved with and is certainly beyond the technical ability of Handicap International which provides only the crudest of prosthetics and orthotics education. Furthermore, there are no organized P & O training curriculums or teaching materials available in Ethiopia.

G. Distribution of Services - At present most prosthetics and orthotics services appear to be located in or near population centers. Since 95% of the population lives in rural areas of Ethiopia the obvious problem will be how to provide services in these areas at sometime in the distant future.

H. Types of Prostheses and Other Devices

It is apparent that Ethiopian prosthetists do not want or appreciate the HI type "appropriate technology" devices. They have the capability to build and probably to teach laminated type or vacuum-formed type prostheses. This could lead to the conclusion that orthotists would want the same type and level of technology. With the volume of work facing the P & O workforce, it is only practical to use somewhat more advanced fabrication techniques to generate devices in volume. Wheelchairs present a separate problem. The existing designs are sturdy but heavy. The wheelchair

problem relates to the terrain and roads in Ethiopia. What is needed is an inexpensive "off-road" wheelchair.

VII. Recommendations

1. The Rehabilitation Agency will be the best organization in Ethiopia in the long run.
2. The ICRC seems to have the best people with the best training to provide the initial efforts in long-term training of prosthetists-orthotists and physical therapists. The level of training of ICRC Prosthetists and Orthotists would need much improvement if they were to be instructors.
3. Handicap International should be supported in its efforts to provide physical therapy training programs in remote areas. Their orthotics technology is marginal at best and prosthetics is pathetic and violates their own principle of "appropriateness" in Ethiopia. If they are to be supported, they should commit to teaching improved prosthetics and orthotics techniques.
4. All NGOs and Rehab. Agency prosthetists and orthotists have limited experience in teaching prosthetics and orthotics. Training and curriculum development as well as continuing education should be provided immediately.

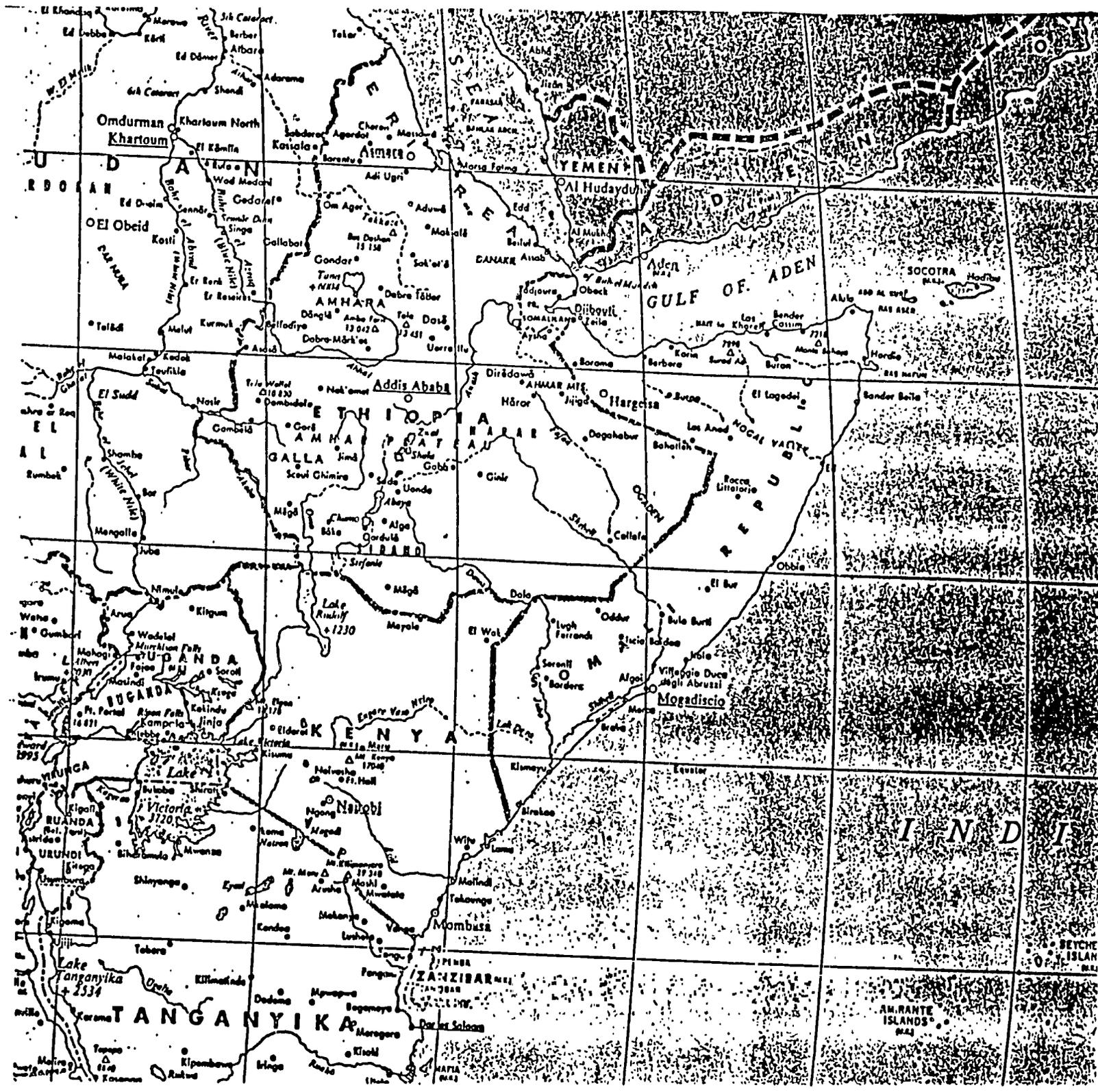
5. Teaching materials for P & O should be written in the form of texts, teaching models, and audio-visual equipment.
6. The need for heavy machinery such as grinders, saws, sewing machines, vacuum-equipment can all be justified. Purchase the most heavy duty versions and best quality. All indications were that people will take care of the equipment and it will not be wasted or under-utilized.
7. Materials and supplies for fabrication of prostheses and orthoses will have to be imported for the foreseeable future. Provision of these materials could free up Rehab. Agency money for training and salary of additional P & O personnel.
8. The best use of US-AID money for rehabilitation in Ethiopia will be to create the foundation of their educational system.
9. A special note regarding Cheshire Home. I would support this project as it represents the only center we saw that is working with polio children. Their needs are chronic and the program is well run, although small. They could be the model for other centers for children in the future.
10. Upgrade existing prosthetics and orthotics personnel with updated fitting and fabrication techniques as soon as possible using short term training programs for the best trained Ethiopian prosthetists. They must become the core of the P & O education programs in Ethiopia.

Final Note

During the visit to Ethiopia many people cooperated to arrange my visits and coordinate travel. US Embassy personnel and US-AID staff were wonderful and made the visit pleasant, comfortable and worthwhile. I would like to thank Wendy Fenton at AID in Addis Ababa for doing an excellent job and making arrangements for the visits to all facilities in Ethiopia, but especially for the trips to Harar and the refugee camp at Hartesheik. Considering the problems in the Persian Gulf during that period, we were able to conduct a good assessment in the time permitted us. Also, the Rehabilitation Agency demonstrated cooperation and flexibility beyond that which was expected. Their suggestions and assistance were most appreciated and would seem to demonstrate a good basis for future cooperation when it is feasible.

Many Thanks,

Timothy Staats





(Above Left) Racing Chair made at the Heroes Centre

(Lower Left) Paraplegic using locally made standing frame while making canvas bags for sale through the Heroes Centre

(Right) ThermoFormed plastic leg made at the Heroes Centre, Debre Zeit

22



*(Above Left) Below knee amputation
surgically good technique. Notice
abrasion from wearing poorly designed
socket.*



*(Above Right) Brace from the
Cheshire Home*



*(Above) Amputee and crutch
(obstacle) training course
at Harar Workshop*

*(At Left) Handicap
International style leg
made at Rehabilitation
Agency's Nazareth Low Cost
Mobility Aide Workshop*



*(Above Left) Below knee legs made at
Rehabilitation Agency's Harar Workshop*



*(Above Right) Director of Low Cost
Mobility Aide Workshop displaying
crutches, prostheses and orthotics
that they make*

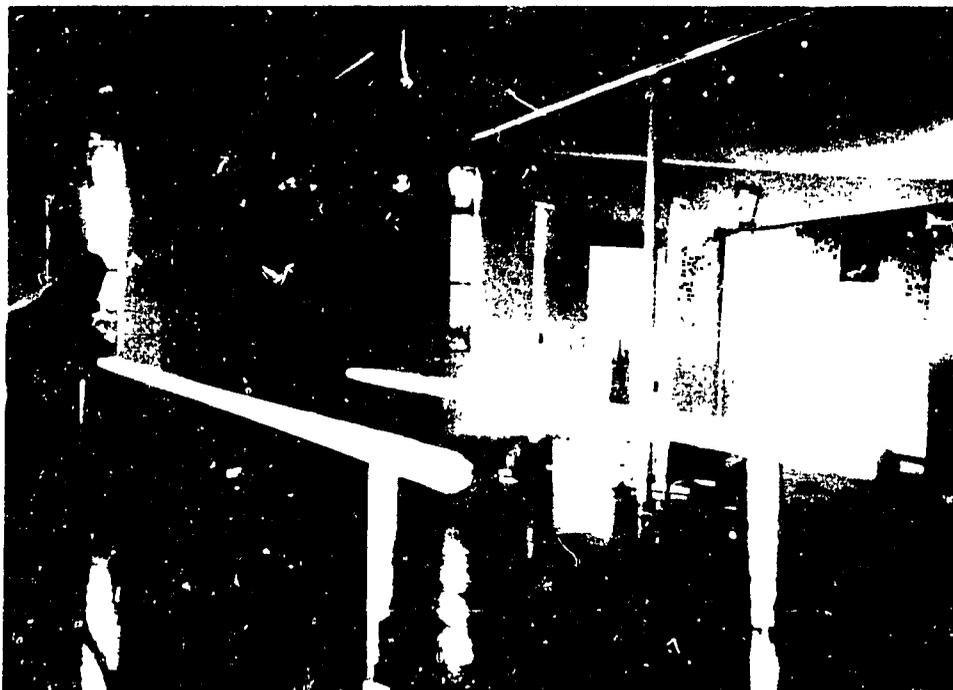
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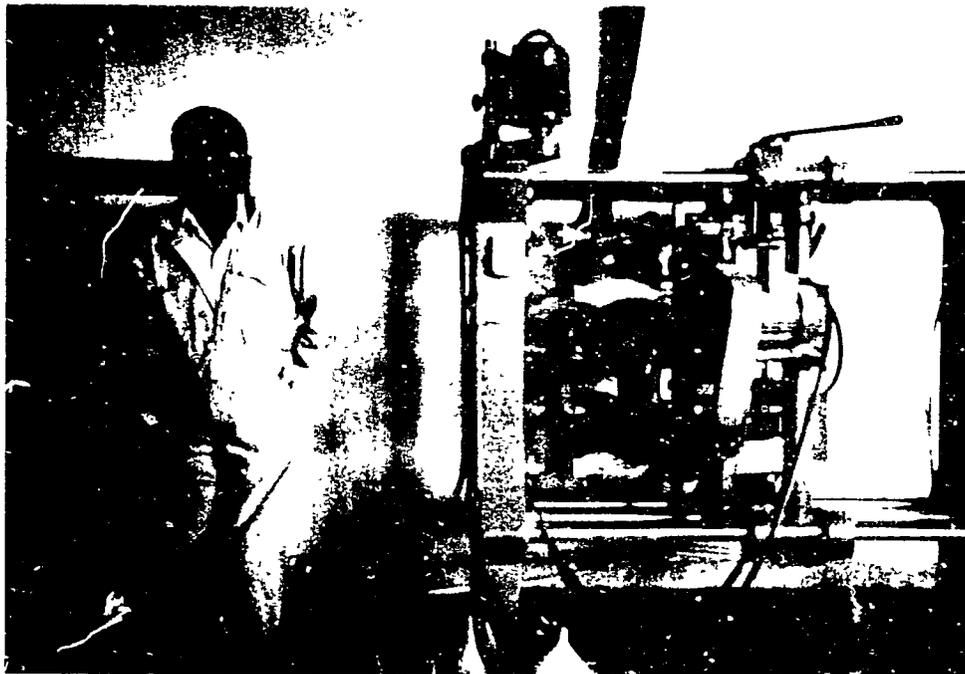
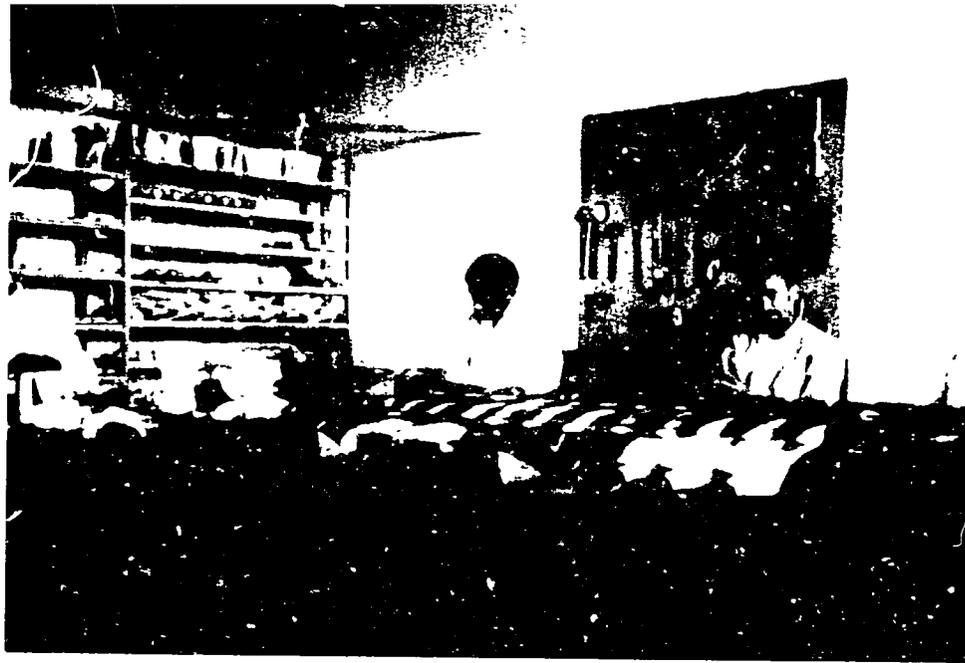
*Example of the type of below
the knee leg made at the
Prosthetic Orthotic Centre, Addis*



*Making knee joints
Prosthetic Orthotic
Centre, Addis*



*Gait training
Prosthetic Orthotic
Centre*



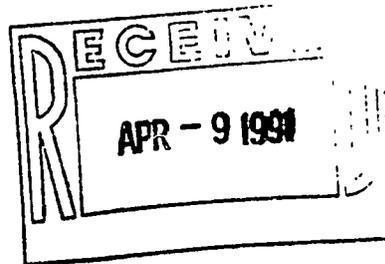
*(Upper Left) Finishing feet
at the Prosthetic Orthotic Centre
(Lower Left) Lathe mass producing
feet at the Prosthetic Orthotic
Centre, Addis
(Above) Long leg brace for the
Prosthetic Orthotic Centre, Addis*

ADDENDUM # 1
WENDY FENTON'S LETTER ((3/26/91)



UNITED STATES OF AMERICA
AGENCY FOR INTERNATIONAL DEVELOPMENT
MISSION TO ETHIOPIA

ENTOTO ROAD
P.O. BOX 1014
ADDIS ABABA
TELE: 550666
FAX: 550774



March 26, 1991

Mr. Glenn O. Patterson
Director, PRITECH
1925 North Lynn Street
Suite 400
Arlington, Virginia 22209

425104 - E T

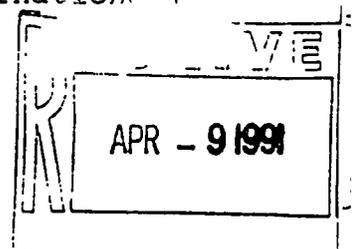
Dear Mr. Patterson:

Thank you for your letter of March 14, 1991 enclosing Mr. Staats' draft report entitled, "Ethiopian Prosthetics and Orthotics Needs Assessment." After careful review of Mr. Staats' assessment, I offer the following comments:

Page 6, para 1: I am not in a position to disagree with Mr. Staats' assessment of the apparent superior level of technology at the Heroe's center; however, all expatriate prosthetists and physiotherapists currently working in Ethiopia agree that it is neither as productive nor as well-run as the Prosthetics Orthotics Center. This indigenous institution has been in existence longer and already provides components and other technical support to various rehabilitation agency workshops across the country.

Page 2, section C, No. 2. Appropriate Technology: First, I would delete the words "so called" and "romantic philosophical" and I would strongly disagree, as would most people here who have had anything to do with overseas procurement, with Mr. Staats' assumption that bringing supplies from Addis Ababa is not that different from importing materials from overseas. Importation is far more difficult and expensive and can take infinitely longer. More importantly, overseas importation requires hard currency which means continuous injections of cash by donors. This same objection applies to a similar assertion Mr. Staats makes in the last sentence on page 8, finishing on page 9.

It should be said that on page 14, section 4, the American therapist Mr. Staats refers to works for Handicap International.



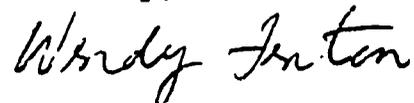
On page 15 section VI, sub-section C, while it is true that NGO input cannot be sustained long term, there is no doubt that ICRC's input has had a major impact in improving the quality and increasing production of prosthetics (ref. Theo Verhoeff's, ICRC Project Leader report). Whether those improvements and increases can be sustained after ICRC input has ended is another matter.

I also question Mr. Staats' assertion on page 17 that ". . . Ethiopian prosthetists do not want or appreciate the HI type appropriate technology devices." It would be more accurate to say that the few Ethiopian prosthetists he spoke to expressed this opinion.

Mr. Staats' statement that "...The Rehabilitation Agency (RA) will be the best organization in Ethiopia in the long run..." needs qualification. The best organization for what? Does he mean to coordinate the disparate efforts being made here in Ethiopia on behalf of all disabled? Or does he mean prosthetics/orthotics in particular? If it is the latter, I strongly disagree. At present, the Rehabilitation Agency does not have the management structure, the technical expertise, or the budget to assume this role.

Apart from these inaccuracies, given the time available, we found Mr. Staats' report to be an interesting assessment of prosthetic and orthotic services in Ethiopia.

Sincerely,



Wendy Fenton
USAID Ethiopia

cc: AFR/TR: Gary Merritt
ST/H : Lloyd Feinberg, PRITECH Project Manager
ST/H : Allen Randlov
AFR/EA: Dick Eney

ADEENDUM # 2
TIMOTHY STAATS' LETTER (4/25/91)



DIVISION OF ORTHOPEDIC SURGERY
PROSTHETICS-ORTHOTICS EDUCATION PROGRAM
REHABILITATION CENTER, ROOM 22-46
1000 VETERAN AVENUE
LOS ANGELES, CALIFORNIA 90024-1795

April 25, 1991

To: Carrie O'Neill Sr. Program Asst.
Pritech
1925 North Lynn St. Suite 400
Arlington, Virginia 22209

From: Timothy Staats
10627 Baton Rouge Ave.
Northridge, CA 91326

Re: Response to Ms. Fenton's Comments to Mr. Patterson

After reviewing the letter you sent to me I can respond as follows:

Page 1, para 2: I agree with Wendy that POC is probably better organized than Heroes Center. My report referred to the "technology" of the prosthetics work. Heroes Center was introducing thermoplastic vacuum-forming techniques which are more advanced than any other facility we saw in Ethiopia.

Page 1, para 3: I disagree with her statement. However, this is a complicated issue. Most, if not all countries have to import various chemicals or components to have good prosthetics services. This is true also in

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Ethiopia. Both liquid plastic laminates and vacuum-formed thermoplastic limbs will require import of plastics. The alternative is to make prostheses out of leather which is available in Ethiopia. I stand by my statement that the "leather" level of technology must not be encouraged and is sub-standard. US dollars should not be spent to promote this poor level of practice in a country where a majority of the prosthetists have more advanced plastics technology. If the French/Handicap International want to do this, let them pay for it. While importation is time consuming and a bother it is and will continue to be necessary. I would suggest US-AID set aside a portion of the money for importation of necessary raw materials. This is a critical element in prosthetics.

Page 1, para 4 and Page 2, para 1: I couldn't agree more that ICRC has done an excellent job, as has Handicap International's physical therapy project.

Page 2, para 2: While we did indeed speak to only a few Ethiopian Prosthetists, they represented probably 25% of the total population of prosthetists in the country. These men knew the difference between their work and the Handicap International leather work. They had nothing good to say about it nor did the men who we met who could only do this level of work. The HI workshop we visited was only an hour or two drive away the Heroes center where much more advanced work was being done. This was very discouraging to the prosthetists at the HI workshop. Since the HI workshop has electricity, the provision of additional equipment and training could increase production and quality of care within a very short period. My comments are accurate.

Page 2, para 3: The reason I think the Rehabilitation Agency is the best bet for the future is because it was my understanding that they are the gate-keepers for paying salaries of Ethiopian prosthetists. I was asked which agency would be best qualified to deal with prosthetics and orthotics concerns in Ethiopia. I

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did not consider HI or ICRC to be Ethiopian entities. While the Rehabilitation Agency does not have the management structure, or the technical expertise, or the budget, as mentioned by Ms. Fenton, they appeared to me to be the only large Ethiopian Government entity interested in prosthetics and orthotics as part of a total national rehabilitation package. If the Ethiopian Government survives and the RA continues its activities, they are, I believe the appropriate agency to oversee the prosthetics-orthotics activities. If they are deficient in certain areas, such as management and technical expertise possibly US-AID should consider providing financial assistance to upgrade their capabilities in these areas. Again, I would stand by my statement with the qualifications I have mentioned here.

Page 2, para 4: I disapprove of Ms. Fenton's use of the word "inaccuracies". This makes the presumption that my analysis is somehow wrong. This is not a matter in which anything is accurate or inaccurate but rather a matter of perception and of opinion. I am fully appreciate Ms. Fenton's comments and welcome the opportunity to work with her or with US-AID in the future.

I do not feel that any comments in her letter substantially change what I have written in the report. Please add this letter as an addendum to the report if required to clarify my findings.

Sincerely,



Timothy Staats

10627 Baton Rouge Ave.
Northridge, CA 91326

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ADDENDUM # 3
ALLEN RANDLOV's LETTER (4/29/91)

April 29, 1991

TO: Carrie O'Neill, PRITECH

FROM: Allen Randlov, S&T/H

SUBJECT: Comments on Responses to "Ethiopian Prosthetics and Orthotics Needs Assessment"

I have some comments that I feel will conclude discussion on issues that have been brought up in the following letters:

-letter from Wendy Fenton, USAID/Ethiopia, dated March 26, 1991

-the April 26, 1991 response from Tim Staats, UCLA.

The letters refer to the report "Ethiopian Prosthetics and Orthotics Needs Assessment".

Wendy has suggested some changes in the wording of the report dealing with the approach taken by HI and on the possibility of importing supplies for manufacturing prostheses. Tim has said that he feels that HI's approach, "the leather level of technology must not be encouraged and is sub-standard." He also states that "most, if not all, countries have to import various chemicals or components to have good prosthetics services."

Given the geographical and economic realities of Ethiopia I think both of these assertions should not be used in any planning process without further study and clarification.

Regarding leather sockets for prostheses vs. resin. There is no doubt that resin is superior and that prosthetists and patients would choose resin over leather. But, Ethiopia is a very rural country. The people with access to the orthopedic workshops in Addis, Harar, etc. represent a small fraction of the total population. I would argue against there being different standards of care for urban and rural people, but in the foreseeable future it is doubtful that the majority of the people in the country will have access to the orthopedic centers or that the centers will be able to get out to them. Given this situation, I feel that the possibility of training technicians who could make the HI devices available in rural areas using materials available there, cannot be discarded yet.

On importation of supplies. The staff of the Prosthetic Orthotic Centre say they have not had access to foreign exchange for 10 years. Consequently, the supplies they have come as donations from the International Committee of the Red Cross and possibly others. I think the POC may be the primary supplier for the rest of the orthopedic centers in the country. If this is true it makes the

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situation even worse. No long term system of orthopedic services can be finalized without resolving the foreign exchange/imported material problem. Given the visible lack on anti-biotics and other life saving supplies in the hospitals. I expect the availability of foreign exchange for rehabilitation will continue to be a problem. As long as it is, technicians who can make orthopedic devices out of locally available materials (leather) represent an important resource.