The University and the Professional Prosthetist-Orthotist

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The orthotist and the prosthetist in today's orthopedic clinic occupy a position on the rehabilitation team which was undreamed of twenty-five years ago. The prostheses and the orthotic aids prescribed and fabricated for today's orthopedically handicapped persons show only a limited, surface similarity to the devices which were a source of justifiable pride to our predecessors in the fields of prosthetics and orthotics.

I say justifiable pride advisedly because these products of an earlier era were finely crafted indeed. The men who made them were craftsmen and the craftsman's pride in the skillful use of his trained hands is a part of our heritage which it would be shamefully wasteful to abandon today.

It must be recognized, however, that today's prosthetist-orthotist is a man in a position of responsibility of whom much more is expected than craftsmanship. As a member of the rehabilitation team, and I am sure the team concept need not be labored any further, he accepts a para-medical position which demands many things. He must be knowledgeable, with the bulk of current information pertinent to his specialty available to him instantly upon demand. He must be articulate, able to express himself forcefully without discourtesy, and to convey ideas or information clearly in appropriate language. He must be imaginative, capable of visualizing problems before they arise and providing solutions whenever such problems are encountered. All this and more is expected today along with a kind and quality of workmanship of which he can be proud, with a craftsman's pride in work well and skillfully done.

One measure, at least, of our progress toward professionalism is to be found in the number and standing of men such as I have been describing. There are such men, but there is need for many more of them. The questions arise naturally as this need is recognized: Where do we find them? Where will they come from?

The answer, disturbing as it may be, is that such men are not "found;" they are "made," and most of them will come from the ranks of bright young men who are at present in high school or serving out their military obligation.

There is no doubt that the knowledge, the specific information, these men must acquire can be given them. Educational institutions, high schools, colleges, and universities have been giving instruction in specialized fields for many years. Parallels could be drawn between the academic requirements of the prosthetist-orthotist and the academic needs of physicians and dentists or physical and occupational therapists. If the academic requirements of these highly trained and licensed groups can be met by existing educational

institutions it seems obvious that the needs of future prosthetist-orthotist candidates can be similarly met. The procedure may tax and test the brightness of our candidate. It probably will not tax the capabilities of a good school.

But what of our requirement for manual skill? What of our demand for a high level of craftsmanship? Traditionally the answer has been to spend long years "in the trade," or more recently and more optimistically, "in the profession." With the first phase I can agree but not with the second. Competence in a trade or craft can be gained wholly within the craft so long as its training program is carefully supervised. Many excellent examples are to be found in the apprentice programs of the craft unions. Professional competence and professional training are not to be obtained in this manner. The professional man, the lawyer, the clergyman, the teacher, receives his professional training at a college or university.

Then what of our requirement for manual skill? Is craftsmanship a part of any university curriculum? Is the training of hands, as well as minds, a responsibility which our universities are equipped and staffed to undertake?

I believe that it is! It is my opinion that within the framework of college and university industrial arts departments and vocational education courses the solid groundwork of craftsmanship is to be found.

To test the accuracy of this opinion it is only necessary to investigate the skills that are needed and the tools that are used in some chosen area of the prosthetic-orthotic field and compare the list with skills that are taught and tools and machines that are used in vocational education and industrial arts courses covering the same area.

To do this I have chosen the area of metal working. There are a number of reasons for my choice. First, both prosthetists and orthotists are required to do a certain amount of work with metal. Second, there is a considerable amount of instructional material available from educational institutions teaching prosthetics and orthotics which describes processes being used and taught to practitioners in the field. Third, and more personally, I have recently been enrolled in a class in General Metals.

This course in the Industrial Arts Teacher Training curriculum of the School of Education of New York University is included as part of the curriculum for degree candidates in Prosthetics and Orthotics at that school. As I progressed through the course I became increasingly impressed by the high standard of craftsmanship demanded for successful completion of the course and by the close correlation of skills included in the course and skills expected to be a part of the practicing prosthetist-orthotist's stock in trade.

The end result of my investigation of curriculum material of courses in prosthetics and orthotics offered at New York, Northwestern and California Universities and interviews with practicing prosthetists and orthotists has been the following list of metal-working skills which he might be called upon to exercise and tools he could well be required to use:

1. *Measurements*—may require the use of the micrometer, scale, tape measure, ruler, yardstick, inside and outside calipers, dividers, combination or carpenter's square, drill gauge, wire gauge and sheet metal gauge.
2. *Lay-out*—may require use of the tracing wheel, T-square, straight edge, triangles, protractor, french curves, and the bow or beam compass.
3. *Holding metals*—may require the use of the machinist's vise, the drill press vise, pliers of many kinds, as well as C clamps, parallel jaw clamps, spring clamps and various special purpose clamps.
4. *Metal cutting*—may require the use of the band saw, hack saw, shear, cold chisels and a variety of tin snips.

5. *Metal bending and forming*—may require use of various hammers and dies, the anvil, vise fork, bending irons, drift pins and punches, or the slip roll forming machine.

6. *Joining metal to metal and metal to other materials*—may demand the use of drills and drill press, hand and power punches, taps and dies, rivets and hammers, bucking bar, awl and scriber, screws and screwdriver, soldering iron, brazing torch and welding torch.

7. *Metal finishing*—may require the use of grinders, files, belt sanders, buffers, polishers and painting equipment for spray, brush or "flock" finishes.

8. *Heat treating*—may demand use of the furnace, pot, or torch for annealing, hardening, case hardening, normalizing or forging.

In addition to these specific operations in which a high level of skill could reasonably be expected of a prosthetist or orthotist, it was felt that sufficient knowledge of materials should be part of his fund of information to enable him to order raw materials, sheet, bars, angles, rods or wire and be sure they would have the desired characteristics upon delivery. Another area in which knowledge, if not skill, could be expected, would be in machine shop operation so that if some special part or tool is required he would know where to go to get it and how to describe in machinist's language what he wanted made.

This seems quite an impressive array of skills required and tools to be used, but no less impressive is the fact that when a student has completed the New York University General Metals course he has had specific occasion to use each of these tools except the tape measure, the yard stick and the paint brush and he may very well have had occasion to use these also.

An examination of the General Metals course material and course syllabus reveals a Division into six separate kinds of metal and shop work.

1. *Forge and wrought metal* in which is taught the composition and characteristics of iron and steels, use of the furnace, filing, forging, polishing, annealing, hardening, tempering, bending and shaping round, square and flat rod, brazing and welding.

2. *Bench metal* which includes layout, grinding, tool and bit sharpening, sawing, drilling, tapping, threading, filing, letter stamping and polishing.

3. *Sheet metal* in which is covered the gauges and weights of sheets, layout of rectangular, cylindrical and tapered objects, the use of the full range of sheet metal tools and machines, and practice in joining sheet metals by soldering, riveting and seaming.

4. *Art metal* which includes many skills among them metal cleaning, silver soldering, leveling, buffing and polishing, transferring patterns and designs to metal, spinning, forming with molds and with stakes, and using the torch for heat treating.

5. *Foundry work* which includes ramming a mold, casting, cleaning and grinding, split pattern casting and finishing castings.

6. *Machine shop work* in which the student uses lathe, shaper and milling machines.

The correlation between metal working skills and knowledge our prosthetist-orthotist candidate needs and the skills and information taught is so strongly positive that it is startling. This supports my belief that universities *are* well equipped to give to students a solid foundation upon which craftsmanship can be built. I can almost hear detractors saying that a course of instruction such as this is too brief and too all-inclusive ever to make a man a craftsman. I agree. Completion of this course does not make a craftsman but it lays the groundwork. It gives knowledge of tools, processes, and

materials without which craftsmanship is a dream. It demands the fabrication in metal of workmanlike projects on a closely controlled time schedule thus generating the feeling of accomplishment which is an integral part of craftsmanship. It trains the hands and the mind to complement each other, to work together, and this is the very essence of craftsmanship.

As presented, the General Metals course is a valuable educational experience for prospective prosthetists and orthotists. Successful completion of the course will contribute substantially to the fund of information he must have available, to his familiarity with tools and materials, and to his manual dexterity. Hopefully, there will be generated within him an appreciation of the nature and worth of craftsmanship and its development within himself will be well begun.

This brief and admittedly limited investigation indicates clearly to me that there is no need to abandon or in any way lower the craftsmanship standards of prosthetic and orthotic practice of the University trained practitioner, but rather they may be maintained and improved. It indicates too that the training of hands as well as minds is a proper sphere of interest, well within the capacity of a modern university. Finally, these two indications convince me of the necessity and practicality of taking the next long step toward truly professional status. The professional practitioner of prosthetics and orthotics can and must obtain his training against the same background and in the same atmosphere as does every other person practicing a profession; i.e. in the atmosphere of a college or university and against the background of academic as well as practical experience.

Dr. Eleanor Poland Named to VRA

Eleanor Poland, Ph.D., a Kansas City (Mo.) research specialist, is one of 10 women whose appointments to top jobs were announced recently by President Johnson.

Miss Poland assumed her duties March 16 as Executive Secretary of the Medical Study Section, VRA Division of Research Grants and Demonstrations.

The section reviews applications for grants to finance research to improve medical treatment for disabled persons who are placed in employment under the State-Federal vocational rehabilitation program.

Grants awarded in rehabilitation medicine total well over $1 million a year.

Miss Switzer—herself the holder of one of the highest jobs in the Federal service—said, "I am delighted that President Johnson has singled out Miss Poland as one of the outstanding new women to come into government service."

For the last 11 years, Miss Poland has done research in the fields of health, housing, social, and economic problems in the Kansas City (Mo.) area. She was employed by Community Studies, Inc., a private nonprofit organization in that city. During six years of her work there she directed a study of hospital requirements in Kansas and western Missouri.