FOURTH NATHALIE BARR LECTURE

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Hands, Changes, Quality, and Survival

As hand specialists we have a shared appreciation for the complex and almost limitless capacity of the human hand. Although most of our professional efforts are directed toward rehabilitating dysfunctional hands, we are also, upon reflection, reminded of how very special normal hands are. The inherent grace and beauty of the human hand are a never-ending source of amazement. Aside from the face, hands are the only parts of the body consistently presented to the world uncovered. Occurring in a multitude of normal sizes and shapes, hands possess an almost unbelievable ability to perceive even the slightest touch, and, when necessary they substitute for occluded or impaired sight. Success of the upper extremity is often attributed to the mechanical effectiveness of a long, intercalated, open kinematic chain to which an opposable thumb is attached, allowing a single unit to accomplish the work of many through adaptation of segmental posture. The potential for great power and exquisite delicacy are combined in the same housing, and wonderfully intricate function is considered normal, routine.

Our hands allow us to interact with our environments and are integral parts of our work, play, and activities of daily living. Through art, literature, and music, hands become the vehicles for self-expression and grant us access to more harmonious, understandable, and beautiful worlds. Possessing not only marvelous functional capacity, hands also have the ability to communicate at both conscious and subconscious levels, allowing others to perceive through posture, gesture, and appearance the inherent moods and personalities of their owners. We talk with our hands. Hands emphasize our opinions and they pass judgment and vote without uttering a sound. Additionally, hands show, sometimes more obviously than verbal communication, unexpressed emotion. We focus attention on our hands by adorning them, and while slight differences in physical capacity and use may be found among societies and cultures, the need to touch is universal. As an autonomous, freestanding unit, the touch of a hand allows us to know that we are not alone.

In illness hands may reflect dysfunction in other parts of the body, or they themselves may become unfortunate victims of a disease process that insidiously erodes away normal function. Because they are involved in nearly everything we do, hands are often incapacitated through direct or indirect trauma. The normal response to injury of pain and swelling fre-

quently leads to diminished function, and, if left untreated, once supple active hands may become stiff and contracted. If a part of a hand is absent or ablated, considerable functional capacity is retained through the marvelous adaptability of remaining uninjured portions of the kinematic chain, with more proximal loss resulting in greater functional disability. Not so surprising to those who work with hands, a truly acceptable and workable alternative to the human hand has eluded the best efforts of our most talented scientists and engineers. In addition to functional impairment, the emotional component of a hand injury cannot be underestimated. Without the counsel of compassionate and astute hand specialists, reaction to injury may become disproportionate, needlessly limiting rehabilitative potential.

CHANGES IN HAND THERAPY

From infancy to old age, hands undergo change with early rapid alterations related to growth, giving way to quiet subtle changes that reflect a lifetime of use. As hands change, so too does the specialty area of hand therapy. While the changes we currently experience are not as meteoric as those initially encountered, we continue to be in a period of active development. In the middle sixties when I began treating hand injury patients, occupational therapists were often considered to be "basket weavers" and physical therapists were "bone crushers." Sadly, in many ways these labels were not undeserved, and early hand surgeons were heard to say that "the only good therapist is a bilateral upper extremity amputee." Although seemingly harsh, these opinions were often directly related to the level of treatment for the times, when the now basic concepts such as integration of treatment with wound-healing stages and the positive effects of prolonged gentle stress and early motion were not fully appreciated. With the exception of a few highly skilled therapists scattered across the country, the general knowledge of therapists working in clinics was not sophisticated enough to meet the complex demands of treating hand problems successfully. Fortunately, through organization and sharing, and with the help and determination of many dedicated people, we have come a long way from those very frustrating early times. Hand therapy

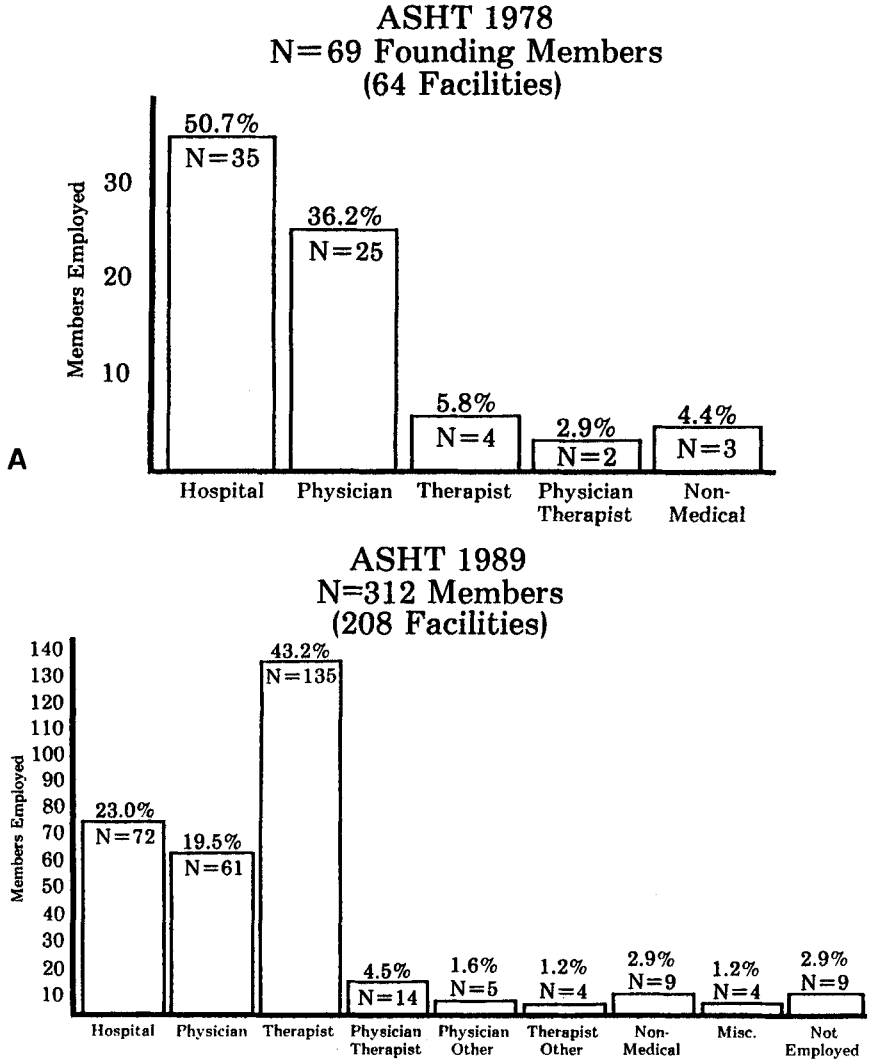

FIGURE 1. *A, Ownership of facilities in which ASHT founding members were employed in 1978; B, Ownership of facilities in which ASHT members are currently employed.*

is now one of the most recognized and sought after therapy specialty areas. One of the main reasons for this success is that hand therapists have contributed and continue to contribute to an ever-increasing body of specialized knowledge.

Over the years our employment trends have also undergone a metamorphosis. A recent survey of 312 American Society of Hand Therapists (ASHT) members working in 272 facilities found that in 1978, 50.7% of the founding members surveyed worked in hospital settings, 36.2% were employed by physicians, and only 5.8% were in independent therapist-owned practices (Fig. 1A). In contrast, as of August 1989, 43.2% of all ASHT members surveyed are working in therapist-owned practices, 23% in hospital settings, and 19.5% in physician-owned facilities (Fig. 1B). Therapists co-owning practices with medical or nonmedical personnel also increased to almost 6%. While these statistics are truly exciting, it is important to remember that they are reflective only of highly experienced hand therapists who are members of ASHT. They do not identify the trends of non-ASHT therapists, who often tend to be less experienced or are novices in the treatment of hand problems, but who are employed in hand rehabilitation facilities.

Changes in the legislative environment have and will continue to have considerable effect on the development and direction of hand therapy as a specialty area. A potentially major piece of legislation that looms in the near future is HR 939. Originally, the intent of the "Stark" bill was to eliminate all methods of physician self-referral. It has recently been amended to allow certain exceptions when quality care cannot be provided elsewhere. If passed, this bill would have obvious repercussions on hand therapists and physician-owned therapy centers. Much debated, the effect of this bill is yet to be realized. Proponents see it as a means of curtailing physician misuse, citing conflict-of-interest problems and arguing that it is unethical for physicians to refer patients to facilities in which they have vested financial involvement. Opponents seem to be divided between those who feel that this type of bill is not necessary because misuse is limited to a very few, and others who say that loopholes in the bill will allow those who are misusing the system to continue to do so.

Along with peer review, utilization review, and diagnostic-related groups (DRGs), outcome management has the potential to directly influence hand therapy practitioners. Considered "the third big revolution in medicine in our time,"[1] under this proposed system treatment efficacy will be assessed and monitored by third party providers, HMOs, hospitals, and business and consumer groups. By evaluating patient status before and after treatment, large discrepancies in treatment practices and costs may be identified. In this age of computers it will not take long to pinpoint those "outliers" who produce small results for big dollars in comparison to other centers that provide better results at less cost (Fig. 2). While the "Stark" bill addresses physician misuse, outcome management has the potential to identify problem facilities, whether physician- or therapist-owned.

Patient attitudes have also changed over the years.

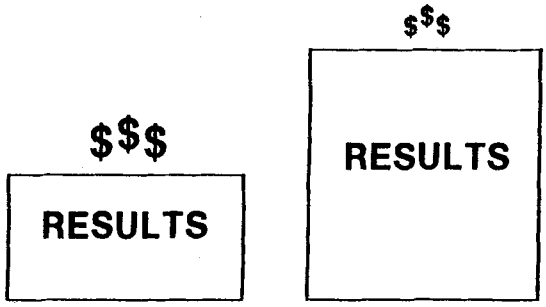

FIGURE 2. *Facilities that produce inferior results at higher costs will be identified.*

A recent letter to the editor of *Time* magazine expresses very well a trend that most of us have noted. "After 32 years as a physician, I have discovered that while I used to be a doctor and take care of patients, I am now a health-care provider and take care of potential adversaries."[2] All too frequently patients assume opponent roles instead of functioning as integral members of rehabilitation teams. While this may not be true of the majority of patients, it does describe a growing trend that threatens to dehumanize the therapist/patient relationship.

ACCOUNTABILITY AND QUALITY

We seem to be caught in a "Catch-22" situation. While third party providers are trying to cut their expenses, therapists are faced with rehabilitating patients at ever-increasing operating costs, and the bottom line is that we are accountable for what we do. As those responsible for directing rehabilitative intervention, we cannot afford to approach patient treatment in a regimented manner, for this generates mechanical and uninspired results at great cost. Therapists who run patterns propagate "cookie cutter" products (Fig. 3). Whereas this has not been the tradition of hand therapists past or present, we all have encountered new therapists, therapists under pressure to produce, or those who are unmotivated, who tenaciously adhere to prescribed protocols without

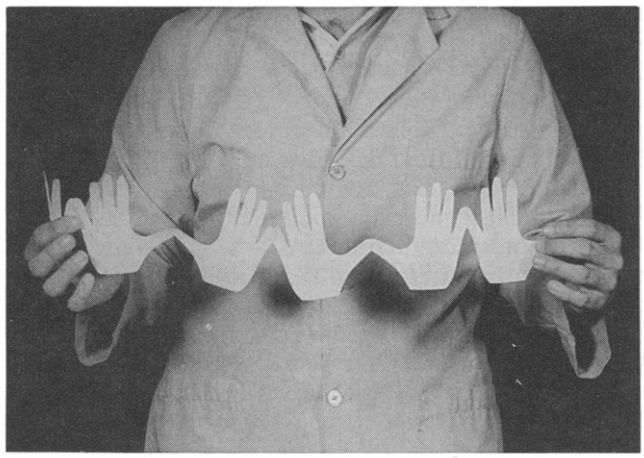

FIGURE 3. *Blind adherence to rote protocols produces "cookie cutter" results, severely limiting patient achievement of full rehabilitative potential.*

regard for individual patient variables. Abusers of the system will endanger us all.

The only way to survive external monitoring over the long haul is to produce quality products. Patients absolutely must be treated on an individual basis, incorporating thorough understanding of anatomy, physiology, pathology, and biomechanics into each and every program. Ten repetitions of a given exercise are not magic, and yet there are those who never question why ten. Why not seven, or perhaps 14? Technicians can be trained to be "finger pushers" at far less expense. Passivity is not sufficient. We must all be active participants in our efforts toward quality, for the heady feeling of our new-found autonomy could be replaced by a rude awakening. The reins of control have been passed to us rather quickly. We must insure that our speeding wagon does not suddenly go careening into a ditch. Are we prepared to justify all that we do?

QUESTIONING AND QUALITY

To illustrate a point, I would like to share two experiences that eventually made indelible marks on my career. As a young therapist, I did not question the teachings of others until one day when I was testing a 3-week post-thumb replantation patient for establishment of baseline sensibility. Upon contact of a tuning fork to the tip of his replanted thumb, the patient immediately reported that he could "feel" the vibrations. Knowing that peripheral nerves do not have the ability to regenerate over a 2-inch span in 3 weeks time, I had to conclude that something was wrong somewhere! The second experience came not long after this. One of the doctors for whom I worked returned from a meeting with a newly purchased intermittent pressure machine. Unfamiliar with its technical operation, I studied the literature, consulted with other therapists, and relentlessly interrogated the manufacturer's sales representative. To validate my technique, I took pre- and post-application measurements using both a tape measure and a volumeter. Much to my surprise, some of the patients actually increased their hand mass according to volumeter measurements. I rechecked all my sources and was assured that I had made no mistakes in procedure. Distressed, I contacted the prominent hand center whose name was closely associated with the machine in hand-related literature and was amazed to find that they had never done pre- or post-application measurements. Again, something was wrong! We designed a study to follow those patients who received intermittent pressure treatments and eventually found that almost 40% of those studied demonstrated increased volume. Ultimately we quit using this modality, because we found that other methods for reducing edema were more efficacious.

In summary, I learned several important lessons from these two experiences: (1) Understanding of a phenomenon is only as good as the instrument used to measure it. Both the tuning fork and the tape measure gave information that did not correlate with reality. We now have at our disposal several assessment instruments whose reliability levels have been proven statistically: the volumeter, Jamar dynamometer, Semmes-Weinstein monofilaments, and goniometer. Providing they are maintained in correct calibration, these instruments are the keys to verifying our treatment methods. (2) I learned to question the veracity of published articles. One can never assume that because something is published in a book or scientific journal that it is entirely correct. Although editors and review boards do their best to vet submitted articles, they are not infallible and the ultimate decision to believe or not rests with each reader. These two lessons have served me well throughout my career.

If we are to produce a quality product, we must avoid being like the townspeople in "The Emperor's New Clothes." To keep things in proper perspective, experience based on concise and accurate measurement must match theory. If it does not, then we must question why not. Just because a concept is taught in school, read in a publication, or seen in an advertisement does not mean that it is clinically efficacious. We are constantly bombarded with new and unproven gadgets, techniques, and theories. Some work, some do not. As consumers we must be more demanding. We must be thinkers. Parroting of beliefs without thought or question can be disastrous. To date very few of the techniques and modalities that we routinely use have been proven through appropriately designed prospective studies yielding statistically significant results. Unfortunately, gadgets and gizmos are often indicative of insecure therapists who unwittingly allow equally insecure patients to become dazzled, eventually developing false dependencies on unproven "crutches." Costs soar, profits are made, and results decline. Presently, the field of hand rehabilitation is riddled with unproven techniques and theories. We must each make a commitment to ourselves and to our patients to seriously question all that we do. Cookbook approaches must be fervently avoided. Through carefully planned and executed research, we must identify that which works and discard that which does not. Critical to this concept is the understanding that good research begins in the clinic with each therapist proving unequivocally to himself or herself that the treatment techniques he or she is employing are verifiable through quantitative measurement. Those who do this will survive outside scrutiny because their product will be better. Those who misuse the system with therapy units that function more like concession stands will be identified, and, if they persist, they will be eliminated through lack of financial reimbursement.

WORKING TOGETHER

Additionally, if we are to survive as hand therapists we must continue to work together as we have in the past. Combined efforts between occupational and physical therapists toward a common goal has been one of the hallmarks of ASHT. Others cite our success and look to us as a role model for having established effective interaction between the two

groups. Each specialty area brings a unique frame of reference[3] and together the combination is unbeatable! We have all grown because of the contacts we have made in ASHT. The point is not to build an edifice to our respective original professions, but rather to provide quality patient care. We can do this better as a team than alone. When we battle each other, we as professionals lose, and an even greater tragedy, the patients lose.

THE FUTURE

While no one can read the future, one assurance is certain: "If quality is present, everything else falls in place."[4] These are exciting times. We have tremendous potential at our finger tips. Through honest analytical thinking and good research using quantitative measurement, we can and will shape the focus of hand rehabilitation and hand surgery for decades to come. We are a long way from "basket weavers" and "bone crushers," and although we should look back occasionally to appreciate our progress, we must never allow ourselves to become complacent, for the past has a habit of repeating itself, and it could overtake us if we do not continually strive to improve our professional knowledge.

CREDITING THOSE WHO HAVE HELPED

You have bestowed upon me a great honor by selecting me to present this year's Nathalie Barr Lecture and I am truly humbled and appreciative of your generosity, but there are others to whom the real credit must go. Many years ago I made the difficult decision to leave the Hand Center of Indiana in order to focus my efforts on writing a splinting book. Going from a staff therapist in a general hospital hand clinic, to having a shelf in a cabinet in Jim Strickland's office, to expanding into a room next door, to opening an official hand clinic with a suite of rooms down the hall, to beginning work on the plans for a free-standing building, I had a tremendous amount of time, work, and pride invested in the Hand Center. However, in all honesty, I knew that the Center would survive and grow without me, but the book probably would not. Because I was one of the first to leave the security of a physician-owned facility, I assumed that I would no longer be a hand therapist. Thankfully I was wrong, and through the help of some gifted hand therapists and surgeons, a new and intriguing world of learning and research began for me. I have been so very fortunate in that teachers have become friends and friends have become teachers. Each has had so much to give, and to these people I owe so much!

Gloria Hershman, OTR, FAOTA was one of the first to lend encouragement. During her term as President, Gloria incorporated business management concepts into ASHT; initiated almost all of the liaison representative positions we currently have between ASHT and ASSH, AOTA, APTA, and AOTF; identified the need for an editorial review board committee; and instigated the writing of the ASHT Clinical Assessment Recommendation monograph, which was co-edited by the combined ASHT Executive Boards of her administration and that of the succeeding President, Evelyn Mackin. Keeping up with Gloria's ideas almost became a full time job unto itself!

Evelyn Mackin, LPT has been a tremendous role model for all hand therapists. Her personal commitment to sharing hand therapy concepts not only at the national level but at the international level has directly influenced us all. I cannot imagine where hand therapy would be without her gentle, knowledgeable, and never-wavering leadership. She sets the example by continuously taking on new challenges, while reminding us to "stop and smell the flowers along the way"!

From the very beginning **Karen Prendergast Lauckhardt, MA, PT** taught us the importance of understanding and incorporating the basic physiologic concepts of wound healing into our treatment programs. When she left New York to accept a triple academic appointment (Surgery, Physical Therapy, Occupational Therapy) at the Hand Management Center of the Medical College of Virginia, we all benefitted as her knowledge increased to even higher levels and she was able to translate complicated theory into readily understood concepts. She has recently opened her own practice in Connecticut!

Judy Bell-Krotoski, OTR, FAOTA has turned the world of sensibility testing up-side-down and in so doing has directly influenced all of our professional lives. A dedicated teacher and impeccably honest researcher, Judy's tenacious investigative research against sometimes impossible odds has been an inspiration. Never aloof or pretentious, she is always willing to share her knowledge. The ramifications of her work with the monofilaments are just beginning to be recognized, and new horizons of understanding of nerve function and repair are becoming apparent.

The first edition *Hand Splinting* would never have been written without **Karan Harmon (Gettle), MBA, OTR.** At a Philadelphia Hand Symposium, a Mosby editor approached me about writing a book on hand splinting. At first it seemed an overwhelming task, but after talking with Karan, it suddenly seemed feasible. Her enthusiasm, willingness to research and organize all sorts of data, and seemingly limitless energy made the long hours of writing bearable. Additionally, I have always admired Karan's special empathetic way with patients. Her genuine concern and gentle, funny humor made them willing and successful participants in their therapy programs.

Karan temporarily left the field of hand rehabilitation and **Cindy Philips, MA, OTR** generously agreed to co-author the second edition of *Hand Splinting Principles and Methods.* Cindy's excellent clinical and academic experience provided the basis for expanding the book and escaping a single philosophy approach. A strong proponent of therapy tailored to meet individual patient needs, Cindy serves as an energetic conscience and role model for us all.

With her exceptional analytic and organizational skills, **Anne Callahan, MS, OTR** has quietly contributed to basic hand rehabilitation theory and tech-

nique as well as serving as one of ASHT's most effective leaders. Her inherent honesty and integrity engender unabashed admiration and trust from those of us who have been fortunate enough to know and work with her.

The recipient of three Petzoldt Awards for her clinical research contributions, **Roslyn Evans, OTR** has defined and expanded important concepts in tendon rehabilitation. Her insatiable curiosity and drive for better understanding stems from an intense desire to provide the best possible rehabilitation experience for each of her patients.

Although few contemporary therapists are aware of her important contribution to splinting and hand rehabilitation, those of us who contacted Brooke Army Hospital Burn Unit in the late sixties know that **Care deLeeuw, MA, OTR** invented and developed the concept of adhering dressmaker's hooks to fingernails in order to apply correctional forces to burned hands. In a pre-super-glue era this was no small feat!

Sharon Flinn-Wagner, MEd, OTR has shown a zest for learning since the days when she was an undergraduate student in a class I taught. Although intensely interested in research, Sharon's unusual insight and compassion for her patients serves as a constant reminder of what therapy is really about.

Robin Miller Wagman, OTR, Shirley Ollos Pearson, OTR, MS and **William Burkhalter, MD** have been active leaders of the hand therapy movement. Both Shirley and Robin have contributed significantly to ASHT endeavors, and Bill Burkhalter has been a staunch and outspoken advocate of therapists for many years. My inclusion in the Burkhalter Hand Society is an honor that I shall always treasure because of these three special people.

In response to a need to find an avenue for publishing scientific papers authored by therapists, an ASHT task force was formed, and in 1981 the members of this task force, Judy Bell-Krotoski, Lynnlee Fullenwider, and I met with **Adrian Flatt, MD,** editor of the *Journal of Hand Surgery*. Knowing that ASHT was too small to support a journal of its own, we hoped viable alternatives might be identified. The end result of this meeting was that, pending ASSH consent, the proceedings of ASHT scientific sessions would be published in the *Journal of Hand Surgery*, and therapists could publish in the JHS without physicians as co-authors provided they met the same criteria for publishing required of physicians. Approval was granted and, needless to say, we were elated! Hand therapists owe a great debt to Adrian Flatt for having the courage to stand by his convictions over the ensuring years, for not all physicians have been supportive of this decision.

Richard Smith, MD was a gifted and energetic teacher. Through his own enthusiasm for learning and his special appreciation for hands, he inspired those around him to question and to learn. The void he left will be felt by surgeons and therapists alike for many years to come.

The contributions of **James Hunter, MD** and **Lawrence Schneider, MD** to the field to hand rehabilitation are numerous and well known. Their steadfast belief in the value and abilities of therapists has significantly altered the entire profession. Through their annual rehabilitation symposium and their book, *Rehabilitation of the Hand*, co-authored by Evelyn Mackin and Anne Callahan, therapists and surgeons have met on equal terms to teach and to learn from each other.

I owe a great deal to **James Strickland, MD,** my mentor and long-time friend. A proponent of quantitative measurement, he is a talented and generous teacher. His off-beat sense of humor makes work fun for those around him, and as a co-author of the first edition of *Hand Splinting* and contributor to the second edition, his excellent writing ability never ceases to amaze me. Always moving on to new challenges, Jim expects the same of his co-workers. By treating me as an equal, he taught me to believe in my profession and in myself.

Directly attributable to **Paul Brand, MD** and his work in India,[5] the idea of hand surgeons and therapists working closely together to improve patient care is but one of Dr. Brand's many fundamental contributions to the field of hand rehabilitation. In addition to pioneering important surgical techniques, he has enhanced the basic understanding of surgical and therapeutic knowledge through biomechanical analysis and forever altered its direction by emphasizing the importance of understanding soft tissue response to stress. Perhaps even more importantly, he has been a tireless advocate for quantitative measurement of all that we do. Dr. Brand's concepts are so intricately interwoven in the fabric of hand rehabilitation theory and practice that without them we would still be "basket weavers" and "bone crushers"! Words are insufficient to convey my appreciation to this great researcher, educator, and humanitarian.

In closing, I would like to thank my family for their support over these many years and, most importantly, a special thank you goes to **Steve Fess,** my strongest advocate, toughest critic, trusted confidant, and best friend!

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