ABSTRACT: A major component of a successful graduate education is the student’s professional family developed throughout the graduate program. Not only important to the student are those directly guiding him or her, such as the advisor and graduate committee, but also those who directly or indirectly influence the student’s competence, philosophy, ethics, outlook, and professional development in the chosen field. A comparison of this professional family with the student’s own blood relatives and extended family is discussed with an introduction to the word mishpucha, a Yiddish term describing this large personal family and its influence.

Key words: Casida award, graduate education, student

INTRODUCTION

In accepting the 2006 Casida Award, I am deeply humbled and accept the honor as a shared one because it would not have been possible without my good fortune in having outstanding graduate students, faculty, and industry colleagues as well as an understanding family. My graduate students shared their love for our work in reproductive biology with me, their fellow graduate students, and the undergraduate students with whom they had contact. My faculty and industry colleagues shared their ingredients and philosophy for graduate training and actively participated in the professional growth of my students and me. My family, wife Ann and 5 children, also shared because work was taken home and not restricted to the laboratory, and the high energy of my children probably contributed by postponing pregnancies among the married graduate students, perhaps increasing time spent in the lab. It is in the spirit of these gifts that I even attempt to provide any useful thoughts on graduate education as a response to this honor.

Upon notification of this recognition and the basis upon which the award was created, I immediately consulted the paper authored by L. E. Casida, published in the Journal of Animal Science in 1966, titled Graduate Training in Animal Science: Degree Requirements and the Involvement of the Student in the Research Program (Casida, 1966). This paper articulated Casida’s philosophy, which I quickly realized paralleled much of the philosophy held by my advisor and mentor at Penn State University, J. Almquist. The philosophy of these 2 great scientists was particularly in harmony with respect to the importance of a broad training combining basic biology and the applied sciences, as well as the early immersion of graduate students in research. Involvement of the student with what I will refer to for the moment as the professional family appeared important in the graduate programs of these 2 scientists and, later, to me personally. Thus, it is toward the professional family of the graduate student that I will focus my comments in addressing components of a graduate education.

In addition to John Almquist, my close professional family included T. Y. Tanabe (dairy science, a Casida-trained PhD), R. Flipse (dairy science), S. Patton (dairy chemistry), and P. Grun (botany), who unselfishly gave of their time and expertise. Also important were many graduate student colleagues, with whom many hours were spent sharing successes and failures, but from whom I would single out 2 who became important colleagues in postgraduate years as well, R. P. Amann and R. McCarthy. External to Penn State University, my professional family also included D. W. Fawcett from the Department of Anatomy at Harvard University.

My PhD research centered on the ultrastructure of the bovine spermatozoon, and at that time there were no faculty at Penn State University working in electron microscopy of biological specimens. John Almquist pro...
vided the resources and encouraged me to seek help from where I could receive the best advice. Clearly, at that time, it was the laboratory of Fawcett for microscopy and germ cell structure. After leaving Penn State University, contact with Fawcett continued and served to guide me in establishing my own program in microscopy at Virginia Polytechnic Institute and State University (Virginia Tech).

Finally, my Penn State University family also included industry personnel. Almquist often included those of us in graduate school to accompany him to the, then, 5 AI cooperatives in Pennsylvania, where we made acquaintances with the stud managers and laboratory and barn personnel. In addition, I recall going to retreats in mountain cabins each year, where the managers, stud personnel, and our laboratory group at Penn State University would discuss common problems and share experiences. I reflected upon these times when reading Casida’s paper on graduate education because it became clear that these individuals were part of my professional family. They colored my career by providing a firm footing in the applied aspects of reproduction. I am sure that this aspect of my family also influenced the template for the professional families of my students at Virginia Tech.

THE PROFESSIONAL FAMILY

Graduate Student Peers

In our laboratory, critical to the family of a student was his or her graduate student peers. Clearly, teamwork is aided by working with people you like and with whom you share a similar work ethic and aspirations. Our selection process was really quite simple, requiring of prospective students an intrinsic desire and aptitude for graduate study, the enthusiasm and curiosity in areas embraced by our program, and the compatibility of the program to meet the professional goals envisioned by the student. Did we make some mistakes? Of course we did! However, when we did make mistakes, both the student and I were aware that this was not the best graduate program he or she should take, and it was usually evident relatively early in the program.

Of help here was what I would call the components of a successful graduate program. Certainly, these components were not all unique to our program, several being adapted from colleagues and mentors. Quite important was the early engagement of the student in ongoing research, teaching, and professional meetings. This seemed the best way to begin making the transition from undergraduate study to graduate study; i.e., the transition from primarily classroom performance to active engagement in uncovering and communicating new information, a transition spanned easily by some and less so by others. The early selection of coursework, particularly coursework relevant to the student’s research endeavors (Casida, 1966) was also important, and we (I and the more experienced graduate students) attempted to identify the more competent teachers in our university. The identification and formulation of the thesis problem, the committee, and the external advisors was usually next, and finally, the communication of research results in oral and written form with emphasis on the audience to which it was being delivered.

Academic and Nonacademic Professional Family

In my judgment, the professional family can be categorized into the obvious 2 distinct elements as one’s personal family; i.e., blood relatives, which would be paralleled by the advisor, graduate student peers, and other members of the laboratory (e.g., postdoctoral students and technical support staff), with the second element being the extended family, which would include academic and nonacademic members that affected the student’s thesis, professional growth, or both. Like any family, this latter component could include quite a few people (analogous to cousins, aunts, uncles, in-laws, out-laws, and friends). The academic side of the extended family would include the graduate committee and other faculty of the university, inside and outside the student’s department. These individuals are critical in contributing to and sharing in the professional development of the student and making his or her background unique. They also serve as an important source of professional references for the student following graduate study. I also viewed this group as important to covering my mistakes, providing assurance that all the bases of a graduate program had been touched (a task that differs markedly among graduate students), or both.

The extended academic graduate family could also have an external component, particularly important where endeavors of research are unique and not shared by other units within the student’s university. This is often helpful when new techniques or insights and approaches are included in the graduate student’s work and have roots and expertise in places outside the university’s walls. It was not uncommon for my students to visit a distant laboratory for assistance, as was the opportunity afforded to me during my training. Reaching out for advice and guidance becomes a valuable tool throughout one’s career, and the confidence to know when and how to do this can be learned in graduate school.

Finally, in our work, the extended family can and should include the nonacademic community. It is here we can again refer to the philosophy of L. E. Casida in the goal of combining the applied and the basic aspects of our science. Where better than the industry serving animal production agriculture can we gain advice and insights to the needs of animal producers? For our discipline, one might envision here the nonacademic family including those in the feed, AI, pharmaceutical, and livestock industries, along with the field veterinary professionals serving animal agriculture.
Components of a graduate education E9

**Graduate mishpucha**

Supportive faculty of  
Dairy and Animal Science departments,  
Virginia Polytechnic Institute and State University

- **Physical Chemistry**  
  Electrophoresis and sperm charge
- **Biology/Veterinary Medicine**  
  Embryology and histochemistry
- **Biochemical/Biomedical/Engineering**  
  Polymer chemistry and microencapsulation
- **Thermal Physics**  
  Infrared thermography and testicular function
- **Endocrine-Immunology**  
  Testis function
- **AI, embryo transfer, Pharmaceutical Industry, and Producers**  
  Advice, resources, partnerships in estrous synchronization, heterospermic and homospermic fertility studies
- **Biochemistry/Flow Cytometry**  
  Cell DNA evaluation
- **Microbiology/Immunology**  
  Semen extender antigens
- **Statistics**  
  Response surface  
  Nonparametric analysis  
  Multivariate analysis

**PROBLEM**

Figure 1. An abbreviated outline of our collective graduate mishpucha, indicating the areas that our graduate students consulted (bold italics) and the applicable area of graduate research.

**THE PROFESSIONAL MISHPUCHA**  
(PRONOUNCED “mish-pooh-kah”)

Recently, a close colleague, Paul Siegel of our Animal and Poultry Science Department at Virginia Tech, introduced me to a Yiddish word that best describes what we are seeking in the professional family. The word is mishpucha and refers to the entire family network of relatives by blood or marriage as well as close friends. When a large group shows up at an occasion in a Jewish family, one might hear the phrase, “My gosh, they brought the whole mishpucha!” As Paul defined this word to me, “one’s mishpucha are really the people who influence most who you are.” I think that we could easily see that our professional family as we are trying to define it is the equivalent of the professional mishpucha. It would seem to me that Casida, in his wisdom of emphasizing the need to combine basic biology and the applied sciences in training graduate students in our discipline, might also find the professional mishpucha an instrument to help accomplish this important goal.

The professional mishpucha of our graduate students, and therefore myself, was highly influenced by the general research mission of our laboratory, which centered on the structure and function of bovine gametes, and reproductive and mammary tissues. We operated under the assumption that knowing the biological structure would greatly help us understand function and thereby provide a basis for predicting function, preserving function, or enhancing function of important tissues. Clearly, this approach gave us a broad spectrum within which graduate students could roam and select a problem. This broad spectrum also invited disaster if one became lost and therefore begged us to include advisors and colleagues with appropriate insights. In this respect, the professional mishpucha took shape by virtue of the inquiry that was undertaken. Not surprisingly, it led to a broad spectrum of colleagues, collaborators, supporters, and tutors to assure that a student had the best chance of succeeding. For our laboratory, I attempted to outline the nature of problems undertaken and the spectrum of disciplines and professional family consulted. It was a far greater task than I had imagined and almost impossible to present in a single diagram. Nevertheless, an abbreviated form is presented in Figure 1, offering an example of the diversification of disciplines, and therefore people, that were pulled into our mishpucha.

Each one of the areas consulted became an enriching experience in itself. However, as many colleagues in this audience well know, that is not where the story ends in a healthy academic environment. By virtue of one’s own expertise, one becomes a part of someone else’s mishpucha, often in another laboratory with a significantly different mission. Our good fortune was our capabilities in microscopy. Through this avenue, many faculty and students from other laboratories spent time with us. We assisted in projects evaluating the structures of reproductive organs and tissues in species ranging from bivalves and reptiles to moose and elephants. We assisted with efforts to determine the
structural formation of kidney stones in rats to the structure of the heat shield in a space capsule. What a pleasure it was for me to interface with such diverse projects and, even more, to watch a graduate student of ours helping researchers in a field of science distant from our own. Not only did we learn more about these different materials, but it also often led us to reexamine our more familiar tissues with greater insight. Most important, perhaps, we became part of other mishpuchas.

Clearly, the graduate mishpucha becomes a part of the past and present success of our graduate students. It has certainly provided excitement and enrichment to my career and shares greatly in my acceptance of the Casida Award. I wish to thank, again, my graduate students, my fellow faculty members, and the whole mishpucha. This award really belongs to you. Thank you and may you all enjoy this profession as much as I have.

LITERATURE CITED