name. Photographs of 1" cross-sections of each wholesale cut was obtained and converted to JPEG format. A second beef side was laterally dissected with the removal of fat and individual muscles removed and photographed along with the carcass. Drawings in GIF format were developed for each picture. Sub-primal cuts were prepared and photographed on a rotating table every 22.5 degrees so all sides of the cut could be viewed. Information about each muscle was obtained and put into a database. The program was rendered using hypertext markup language (HTML). Application logic was written in JAVA so information is presented to a reader using an internet browser as the user interface and allowing the information to be shared. Flash animations were utilized to give the user a three dimensional view of sub-primal cuts. Utilization of computer technology helped to develop a beef myology and muscle profiling manual that can be updated rapidly and accessed world wide through the internet.

Key Words: CD-rom, Beef Myology, Internet

728 Bacon quality evaluation methods. Roger Mandigo*, *University of Nebraska-Lincoln*.

This Reciprocation session will address a variety of techniques and procedures used in the evaluation of sliced bacon. Some of the procedures to evaluate bacon to be discussed include: Camera Visioning and Computer Data Capture for Fat/Lean Quantity, Fat/Lean Color Classification System, Color of Pre-cooked Bacon, Slice Abnormalities, Shattering, Laciness, Length/width of slice, shrinkage during cooking, cooked slice distortion. Other techniques for discussion include: bacon slab firmness, where to measure, how to measure slab parameters, temperature at pressing/slicing and fatty acid profiles.

Key Words: Bacon

729 "Meal Solutions": Value added processing for a changing industry. J.W. Rocke*[1], [1]*RMH Foods, Inc.*.

The dramatic growth of the "Meal Solutions" Category at both Retail and Food Services is signaling the shift from a commodity, fresh meat driven industry to a Value Added, consumer driven industry. This shift is requiring new technologies, processes and approaches to products that were once considered out of date or undervalued. Food Safety, Quality Eating Experiences and Variety are a few of the challenges that must be addressed by processors to meet and exceed the desire of today's consumer.

730 A potential neural tract-tracing method for use in avian species. W.J. Kuenzel*[1], R. Ramesh[2], J.A. Proudman[3], and R.R. Miselis[4], [1]*University of Arkansas, Fayetteville, AR,* [2]*National Institutes of Health, Bethesda, MD,* [3]*United States Department of Agriculture, Beltsville, MD,* [4]*University of Pennsylvania, Philadelphia, PA*.

Turkey hens display broodiness or incubation behavior involving contact of the breast area with eggs. The purpose of the study was to utilize a method found effective in mammals for tracing neural fiber tracts to determine whether it might be applicable for tracing a pathway from the brood patch to the brain in turkey hens. The method employed was the pseudorabies virus (PRV, Becker's strain) procedure. Four turkey hens were utilized: one injected with PRV along the left side of the brood patch near nerve fibers, a second bilaterally injected, a third injected into the left vitreous humor and a fourth served as a control. The concentration of PRV was 4-7 x 10^8 plaque forming units/ml and the amount injected at each site was 5.0 μl. Brain sections were exposed to a polyclonal antibody to PRV (1:10,000) and subsequently processed using immunocytochemistry. Results of the bilateral injection into the brood patch showed immunostaining in the nucleus tractus solitarius, the dorsal motor nucleus of the vagus, the nucleus vestibularis descendens, the ventrolateral medulla and the nucleus reticularis gigantocellularis. Results of the injection into the vitreous humor included immunostaining of two portions of the proposed suprachiasmatic nucleus (SCN) of birds: the SCN pars medialis and the ventral nucleus of the supraoptic decussation. Other neural structures immunostained included the anterior, medial hypothalamic nucleus (n.), the bed n. of the pallial commissure, the paraventricular n., the lateral hypothalamic area, the inferior hypothalamic n., the n. of I, the archistriatum, the intercollicular n. and the central gray. A caution concerning the use of PRV in birds is that the immunostaining was not robust, particularly when brain sections were compared to those performed in rats following injection of Bartha's K strain of PRV into a peripheral injection site. The reason for the reduced number of neurons that show immunoreactivity following injections of PRV into hens compared to the rat is not known. Supported by USDA grant 97-35206-5087 to JAP and WJK.

Key Words: Pseudorabies virus, brain, turkeys

Applications of Ultrasound in Livestock Production Systems

731 Scanning the future - Ultrasonography as a reproductive management tool for dairy cattle. P. M. Fricke*, *University of Wisconsin, Madison, Wisconsin*.

Application of transrectal real-time ultrasonography to the study of bovine reproduction represents a technological breakthrough that has revolutionized our knowledge of reproductive biology. New research information generated through ultrasonic imaging has clarified the nature of complex reproductive processes in cattle including ovarian follicular dynamics, corpus luteum function, and fetal development. Widespread adoption and use of ultrasonography for routine reproductive examinations of dairy cattle is the next contribution this technology will make to the dairy industry. Although rectal palpation is the established method for conducting reproductive examinations in dairy cattle, the information-gathering capabilities of ultrasonic imaging far exceed those of rectal palpation. Assessment of pregnancy status and fetal viability early post breeding to identify cows that fail to conceive improves reproductive efficiency by decreasing the interval between AI services and increasing AI service rate. Early identification of cows carrying twin fetuses allows for implementation of differential management strategies to abrogate negative effects of twinning during the periparturient period. Ovarian and uterine pathologies not accurately detected via rectal palpation can easily be visualized and appropriate therapies selected and implemented. Determination of fetal sex in utero is useful when coupled with a management decision that justifies the expense of fetal sexing. Development of integrated reproductive management systems that combine ultrasound with new and existing reproductive technologies will further ehnance the practical applications of ultrasonography. Collectively, current and future applications of ultrasonography hold tremendous potential to enhance reproductive management and improve reproductive efficiency in dairy cattle. Development of Extension education programs to train bovine practitioners to use ultrasound for routine reproductive examinations is a critical step toward rapid implementation of this technology into the dairy industry. As ultrasound equipment becomes increasingly portable and less costly, it is only a matter of time until widespread implementation of this technology occurs in the dairy industry.

Key Words: Ultrasound, Dairy Cattle, Reproduction

732 Ultrasound applications in beef cattle research and management. A.R. Williams*, *Mississippi State University, Starkville, MS*.

The advent of real-time, B-mode ultrasound has greatly facilitated and accelerated research capabilities in the areas of bovine reproductive physiology and live animal carcass evaluation. The incorporation of ultrasound in bovine reproductive research has led to greater understanding of ovarian physiology, early embryonic development, follicular wave dynamics, and reproductive disorders. Ultrasound has been used extensively in the development of controlled breeding programs involving estrus synchronization and ovulation synchronization for effective timed AI. Practical applications of ultrasound in bovine reproduction include imaging of the ovary as a diagnostic aid, examination and confirmation of ovarian cysts, early pregnancy detection, fetal sex determination, and identification of twins. More specialized reproductive applications include follicular oocyte aspiration (ovum pickup) and follicle ablation. Live animal carcass evaluation is another important area of research. Recent advancements in carcass image interpretation software have allowed for highly accurate estimates of ribeye area, backfat, percent intramuscular fat, and rump fat. Ultrasound measurements are

being used to gather data for genetic evaluations in breeding and feedlot cattle. Instead of relying on progeny testing based on the collection of actual carcass data, beef sires are being evaluated at a younger age with a high degree of accuracy. Several breed associations are currently using ultrasound data to estimate carcass EPDs. Research has indicated ultrasound is effective in sorting cattle in the feedlot for more optimum finishing and sorting prior to feeding. The future of carcass ultrasound includes continued update of current software system models and algorithms, development of an automated software package, and potential use in identifying factors determining tenderness. Practical applications of ultrasound in the beef industry will become normal practice in the near future. Data generated will have a positive impact on both reproductive efficiency and carcass quality.

Key Words: Beef Cattle, Ultrasound, Applications

733 Evolution and use of ultrasonic technology in the swine industry. S.J. Moeller*, *The Ohio State University, Columbus OH.*

The use of ultrasound to measure biological tissue dates back to at least 1950 (Wild, 1950), with early ultrasonic work focusing primarily on human medicine. The application in livestock species was somewhat slow due to the cumbersome, fragile machines and high investment costs. Historically, the application of ultrasound to swine has focused upon composition and reproductive status assessment, with most of the research carried out through universities and land-grant institutions. Hazel and Kline (1959), Price et al. (1960), and Stouffer et al. (1961) using various ultrasonic systems were among the first to report results relating ultrasound readings with carcass measures of composition. However, the accuracy of the early amplitude-depth (A-mode), single-crystal devices was often quite variable. The introduction of B-mode (brightness modality) ultrasound, using multiple-crystal transducers and displayed in real-time (RTU) greatly enhanced the accuracy of live animal composition evaluation (Alliston et al., 1982; Forrest et al., 1986; Turlington et al., 1990) and provided an understanding of extraneous effects on accuracy of measurements. In 1993, the U.S. swine industry implemented a national ultrasound training and certification program for composition assessment on live swine. Early research in the reproduction area utilized Doppler ultrasound systems that measured fluid flow within the uterus (Fraser et al., 1968, 1971). A-mode systems were evaluated by Lindahl et al. (1975) and Hansen and Christensen (1976). Doppler and A-mode devices, while relatively inexpensive and accurate within specified time frames during gestation, are less accurate than RTU. Research indicates RTU is an accurate system of pregnancy detection as early as 22 d after first mating (Inaba et al., 1983; Jackson, 1986; Almond and Dial, 1987). Enhanced technology, increased portability and reduced cost have allowed ultrasound to be a common tool used in swine units, packing plants and research institutes. Future research in the areas of composition, muscle quality, and reproductive biology, along with enhanced imaging capabilities, will lead the way to new, innovative applications.

Key Words: Swine, Ultrasound, Composition

734 Ultrasound as a tool to assess reproductive status in poultry. J.D. Kirby*, R.W. Rorie, V. Melnychuk, and N.B. Anthony, *University of Arkansas, Fayetteville, AR 72701* .

Ultrasound has been used to evaluate reproductive status in humans and other mammals for many years. In the domestic fowl, the primary reproductive organs of both sexes are completely internalized making visual evaluations of reproductive status difficult. Additionally, due to the low relative value of each individual hen or rooster in an integrated production and management system there has been little effort to evaluate the reproductive performance of individuals, resulting in group management schemes. Over the past few decades, the genetic resources used to develop production parent stock has been consolidated into a limited number of elite lines owned by only a few companies. These companies use intense selection, typically only the top 0.1 to 10% are retained, to produce the elite "pedigreed" breeding stock. These elite breeders are then used to develop multiplier great- and grandparent populations. Due to the potential fecundity of poultry, pedigree males and females can ultimately be responsible for many millions of pounds of product produced. We have been able to use ultrasound to assess reproductive potential, primarily in hens, of broiler breeder and layer type chickens. Our results suggest that ultrasound can be used as a tool for selecting individuals with well formed, normal, follicular hierarchies or, in males, testis development. The potential for application in domestic or threatened bird species is tremendous and merits further evaluation.

Key Words: ultrasound, poultry, reproduction

Bioethics in Animal Science

735 Applied ethics and animal science. W.R. Stricklin*[1] and Lars Vikinge[2], [1]*University of Maryland,* [2]*Center for Applied Ethics, Linköing University, Linköing, Sweden.*

Animal agriculture is currently confronting many issues that range across a wide spectrum of public opinion. Environmental issues, animal treatment, gene manipulation, food safety, declining farm numbers, changes in rural society, and farm and food worker labor issues are but a few areas where there are valid differences of opinion relative to ethical questions involving animal agriculture. The response to these issues by animal scientists of course varies among individuals. However, we suggest that a somewhat common view by scientists is of the following type, "I only deal with facts. Science tells me everything I need to know. Philosophy is simply words related to opinion where one can not collect data and establish facts." We contend that values are an unavoidable part of all human decision-making, including for instance choices of research focus in science. We further contend that the methods for moral reasoning used by applied ethicists have many similarities to the scientific process. While we acknowledge that not everyone using this process will always reach the same conclusion, we contend that this is also true for the scientific method. Ultimately, if animal scientists are to serve the needs of animal agriculture as they contend is their mission, then they have an obligation to address the issues that are confronting animal agriculture. The challenge then becomes a matter of seeking methods for beginning the establishment of consensus in a pluralistic society. We will argue that the tools used by applied ethicists can be useful in the pursuit of this consensus. Not necessarily each animal scientist should take on this endeavor, but we propose that it should be a supported activity of at least some. These individuals must expand their knowledge base to include some familiarity of philosophy and arm themselves with additional academic tools other than those of science. Specifically, to increase their effectiveness, they must become somewhat conversant in the methodology of moral philosophy and then work toward the development of collaborative efforts with applied ethicists. And finally, the leadership of the discipline of animal science should work toward facilitating the dissemination of knowledge regarding applied ethics and the process of consensus building.

Key Words: Applied ethics, Animal agriculture, Bioethics

736 Postmodernism for animal scientists. K.K. Schillo*[1] and P.B. Thompson[2], [1]*University of Kentucky, Lexington, KY,* [2]*Purdue University, West Lafayette, IN.*

Our goal is to explore whether postmodernism, a popular perspective within the humanities and social sciences, is relevant to animal science in the context of addressing contentious policy issues. As a social institution in Western culture, the animal science profession favors a modern ideological perspective. This view, which emerged in the 16th century and developed into the 19th century, is characterized by several pivotal assumptions: 1) humans are essentially rational individuals; 2) science is the paradigm of rationality and is therefore the most legitimate source of knowledge; 3)change brought about by science-based technology is inherently progressive. During the last century, there has been growing criticism of modernism. For example, a number of groups question the claim that science is an objective practice and view technology in terms of creating unnecessary risks rather than serving a social good. Such criticisms have been attributed to postmodernism. In general, postmodern theorists emphasize the role of language as a means to explain reality, and argue that because language is both historically and culturally relative, no one account of reality can be purely objective. In this sense, postmodernism has often been characterized as "anti-scientific." Some varieties of postmodernism embrace a nihilistic perspective and