The 
Kansas School Naturalist

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Photo Credits: Front and back covers, and figures 4–19 are from Temple Grandin’s slides accompanying her various DVD programs and videos on animal handling in meat plants. Figure 2 is from the U.S.D.A. Figure 14 is from the Schermer Manual. Figure 15 is courtesy of Dr. Neville Gregory. Figure 20 is courtesy of the American Angus Association and is an excerpt of their Angus Beef Chart. John Richard Schrock provided Figures 1, 3 and 21–22.

Front Cover: After cattle are stunned and unconscious, they are hung and bled out.

Back Cover: After cattle were hung and bled out, these carcasses have been washed and the leather hide carefully removed to prevent contamination of the meat.
MEAT PROCESSING

Today, many youngsters do not know where their hamburger comes from. Many have some vague idea that there is a cow or pig at the beginning and a steak or sausage at the end, but they have little knowledge of the processing that comes in between. That was not the case with pioneer children in the 1800s, or even halfway through the 1900s.

“My father would confer with my mother. When they agreed it was cold enough for butchering, a day would be set and a neighbor asked to help, a labor paid for by a side of ribs....

In a mixture of awe and curiosity I slipped down to the edge of the woods and saw the carcasses hanging, flat, white, and stark. The insides had been piled into a tub and later in the day my mother would remove the fat for rendering into lard. By evening each crock and pan bucket on the property was filled either with chunks of fat or lean pieces of pork to be ground into sausage.

These years afterwards I remember my mother in an old coat and fascinator standing in the cold, pulling off the entrails with her bare hands—my mother who lifted her face at the song of a meadowlark and made a bouquet out of a stalk of rhubarb! Hams, shoulders, and sides were salted and hung in the smokehouse to be cured with hickory smoke. Ribs, backbone, and tenderloins were for immediate eating. Liver, kidneys, and other organs thought inedible made a feast for the cats, and we always had a great many.

Supper was always late on the butchering day, but worth waiting for. I have eaten in famous restaurants, but I have found no meal so memorable as fresh tenderloins, brown gravy, and hot biscuits prepared by my mother.”

—from Peggy of the Flint Hills, pages 93–94.

Those hands-on experiences with meat processing were also important experiences in generating scientists and medical doctors, and in providing a general perspective on life.

► Figure 1. Children in less-developed countries still see meat processed on the street everyday.
In an interview with the *Emporia Gazette* newspaper, one modern Kansas physician explained: “Growing up on a farm, I used to like taking care of animals,’ he said, mentioning farm stock.... He was curious, too, about the internal workings of the fish he caught and the chickens he helped dress for the family’s meals.”

Seeing the fabulously complex soft machinery of animal anatomy motivated him and many other young students to eventually enter research science or medicine.

Such experiences remain key to triggering today’s students interest in anatomy and research. In the study “Eyeballs in the Fridge: Sources of Early Interest in Science” that appeared in the March 2010 issue of *International Journal of Science Education*, Robert H. Tai and Adam V. Maltese analyzed interviews of scientists and graduate students asking what first attracted them to science, when it happened, and what the experience was like.

Their journal article’s title comes from one participant who, as a child, brought home extra cow eyes after her third-grade science teacher helped students dissect them. She placed the leftovers in a brown paper bag into their home refrigerator. Her mother, unaware of her daughter’s project, screamed when she opened the bag. Many years later, this woman scientist identified that moment as a youngster when she made her commitment to science. Whether we will be inspired by such soft, wet anatomy to become scientists or whether we just live in a society where many people eat meat, it is important that we “know where our meat comes from.” This issue of KSN follows our livestock as it leaves the field for meat processing and focuses particularly on the procedures we use to reduce and eliminate animal stress.

**Figure 2.** Some cattle only feed in shortgrass pastures that cannot be cultivated and used for cropland. While some cattle are raised solely on pasture, many spend time in a feed lot where increased feed and reduced exercise increases the fat “marbling” that adds flavor to the meat. Photos: U.S.D.A.
Figure 3. Many farm kids raise livestock to show at county and state fairs. Signing an “intent to sell” is a standard part of showing livestock in competition.
Figure 4. Cattle trucks provide transportation that minimizes physical harm and distress to the livestock. Drivers are cautioned that “when livestock bruises, everyone loses.”

Figure 5. Holding pens at a large processing plant.
Figure 6. Livestock are released in small numbers that are manageable and not stressed.

Figure 7. Workers coax along livestock using plastic bags.
Figure 8. Animals have a “personal space” and entering it can cause flight. A handler uses this knowledge to cause an animal to move without stressing the animal.

Figure 9.

Handler Movement Pattern to Keep Cattle Moving Into a Squeeze Chute or Restrainer

Cattle will move forward when the handler passes the point of balance at the shoulder of each animal. The handler walks in the opposite direction along side the single file race.
Figure 10. Plants designed with a curved chute system provide handling with minimal or no animal distress.
Figure 12. A variety of stun guns are used for livestock.

Figure 13. Effective stunning produces immediate unconsciousness.
Correct stunner application is important to produce unconsciousness in the animal. (From: The Schermer mechanical stunning apparatus, Instruction booklet, Alpha International Corp., New York, NY.)

Waveform of a good stun where the animal receives the full intensity and duration of the current.

Electrodes also produce immediate unconsciousness.

A variety of electrode systems are used.

Captive bolt guns produce instantaneous unconsciousness by firing a retractable steel bolt into the brain. They destroy the brain instantly and have the same affect as a firearm. They are safer to use than a gun with a free bullet. Electric stunning produces instantaneous insensitivity by passing sufficient electric current through the brain to induce a grand mal epileptic seizure. After stunning, unconscious animals will have kicking leg reflexes.
Figure 18. A conveyor system supports the animal through the stunning process to the point where it is hung and bled out.

Figure 19. Beef is being trimmed on the processing line. This process follows the procedure seen on the back cover.
Figure 20. Further cutting provides the cuts many people recognize as “chuck,” “flank,” etc. (American Angus Association)

Figure 21. The final product neatly wrapped in the meat counter at the local grocery store.
There is a big difference between the street-side butchering in a foreign country (shown in Figure 1) and what is allowed in the United States today.

Food safety is governed by three major federal laws: the Federal Meat Inspection Act (FMIA), the Poultry Products Inspection Act (PPIA), and the Egg Products Inspection Act.

The Food Safety and Inspection Service (FSIS) operates under the U.S.D.A. and is responsible for ensuring the safety and wholesomeness of meat, poultry, and processed egg products and ensures that it is accurately labeled.

The FSIS employs about 7,800 plant inspection personnel and inspects more than 6,200 meat processing plants.

While this government agency is responsible for ensuring food safety, the industry is responsible for assessing the grades of meat. FSIS conducts carcass-by-carcass inspection at all federally inspected slaughter facilities and verifies that establishments follow all food safety and humane handling regulations.

**Figure 22.** Samples of both incoming meat and final product are tested for contamination by Escherichia coli.
Five-Day Camp-out on Four-Days of Food—And a Live Chicken

This was a lesson at a school. The course description of this optional outdoor education unit for middle school students made it clear that the culminating activity would be the killing, dressing, cooking and eating of a chicken for the last day’s dinner.

There would be no other food available for that day.

After four days of providing chicken feed to their last meal, the students were given a cleaver and their live chicken.

No one was forced to kill the animal.

Some chose to go hungry that day.

Among the “objectives” of the lesson:

• Don’t expect someone to do something for you that you are not willing to do for yourself.

• There is a connection between the plastic-wrapped, sanitized piece of meat in the supermarket and a living animal.

Our grandparents knew where their meat came from. They knew what “butcher knives” were used for. But the number of rural families is shrinking. Today, agriculture makes up only 0.7% of our workforce. With the passing of every year, our youngsters have less-and-less exposure to the realities of what happens at a packing house.

“We’ve got to show what we do. We’ve got to get over being bashful.

Professionals in the meat packing industry need to show stuff done right. They need to put up tons and tons of videos showing the entire process. Far from driving students away, this understanding will encourage many young people to consider agricultural technology as a career.

Schools need to introduce our agriculture, ag-technology businesses, and related careers to students in elementary and middle school. We need the participation of our local industries and they need to be fully open about what they do.

If you don’t show kids interesting stuff, they won’t get interested in interesting stuff.”

—Temple Grandin, Colorado State University