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Early Industries (<1900’s):

- Dairies
- Markets/Meat Processors
- Universities/AG Research Stations/Extension Education
- Veterinarians
- Woolen Mills
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Recent Industries (>1900’s):

- Feed Companies
- Pharmaceutical Companies
- Mechanization
- AI/ET/Cloning
- Consultants/
  Accountants
- AG Engineers
- Computer specialists
- Etc.
Recent Advances in Biotechnology: Cloning

Leachman’s Eleanor 7905
“Queen of the Red Angus breed”

Clone of Leachman’s Eleanor 7905
Born 11/05/05
Livestock & Poultry Density Factors:

- Livestock raised close to feed supply
- Grains and hay grown on flat land
- Pastures and range found on more hilly/mountainous land

- Corn Belt of Midwest
  - Greatest density (more red meat per square mile)
  - Iowa nets over 5.5 billion $/year in revenue from livestock
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Number 1 Ranks by State:

Dairy – California
Beef - Texas
Broiler/Eggs - Arkansas
Swine - Iowa
Turkeys - No. Carolina
CHANGE IN BEEF COWS NUMBERS
JANUARY 1, 2003 TO JANUARY 2013
(1000 Head)

U.S. Total: -3236

Livestock Marketing Information Center
Data Source: USDA-NASS
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Geographic Shifts:

Dairy – WI/NY to South and West
Beef – Plains/Mountain states to Southeastern states
Broiler/Eggs – North/Central states to Southern states
Swine – No shift – still concentrated in the Cornbelt

-- A “Dynamic” Industry
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Different components of the animal industry:

A. Feed manufacturing

1. There are approximately 6,000 feed mills in the U.S.
   ✓ ~120 million tons of complete rations, high-protein supplements, mineral and vitamin mixtures, and premixes
   ✓ Largest proportion sold to poultry producers. Why?
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- Employ technically trained people including nutritionist, chemists, and scientists.

How do each of these professions contribute to feed manufacturing?

- Today feed companies are becoming more specialized:
  - Fewer feed types carried due to regional catering of livestock
  - Mini-pellets for early weaned pigs, rumen by-pass supplements, antibiotic-free and organic feeds, etc.
  - Offer farmers credit loans, computerized feed formulations, etc.
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B. Markets

1. The market is considered the “barometer” of business.

- Prices are generally established at markets
- Supply and demand are balanced and price is determined by weight, condition, grade, dressing % (slaughtered carcass) and quality
  - specially trained people needed to visually estimate these traits
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2. Markets provide a **transfer system** of the animal product from the producer to the consumer.

✓ animals sold through auctions and terminal markets, and as of recent via satellite
  
  ▪ As processors become more accessible to producers the use of auctions will continue to decline.
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3. The term “market” may also refer to a commodity market where future contracts (non-cash) and operations are bought and sold.

- Prices dependent on future speculation of market prices
- Contracts state the quantity, quality, time, and place of delivery, etc.
- 90% of animals harvested today are sold directly to the processor (e.g., King Ranch Feedyard and Tysons)
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C. Processors

1. Meat processor

✓ >7,000 processing plants (Sam Kane’s)

<table>
<thead>
<tr>
<th>Species</th>
<th>Number of Plants</th>
<th>Number of Head</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>795</td>
<td>34,650,200</td>
</tr>
<tr>
<td>Calves</td>
<td>339</td>
<td>1,416,000</td>
</tr>
<tr>
<td>Hogs</td>
<td>757</td>
<td>98,882,400</td>
</tr>
<tr>
<td>Sheep and lambs</td>
<td>556</td>
<td>3,657,200</td>
</tr>
</tbody>
</table>

*Excludes all poultry plants.*

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- Meat disassemblers - grocery

- By-products - Any product other than meat
  - Pharmaceuticals – antibodies, enzymes, hormones
  - Industrial – fat, leather, insecticides, mineral feed sources
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PRODUCTS MADE FROM CATTLE

BRAIN
- Anti-aging cream
- Medicines

BLOOD
- Pasta
- Imitation eggs
- Cake mixes
- Dyes and inks
- Adhesives
- Minerals
- Medicines
- Laboratory research materials

BONES
- Refined sugar
- Charcoal
- Fertilizer
- Glass

HAIR
- Air filters
- Brushes
- Felt
- Insulation
- Plaster
- Textiles

SKIN
- Gelatin
- Flavorings
- Emery boards
- Sheetrock
- Wallpaper
- Adhesives
- Medicines
- Candies and confectionary

FAT
- Chewing gum
- Candles
- Detergents
- Fabric softener
- Deodorant
- Shaving cream
- Perfume
- Petfood
- Cosmetics
- Creams and lotions
- Crayons
- Paint
- Oils and lubricants
- Biodiesel
- Plastics
- Waterproofing agents
- Cement
- Ceramics
- Chalk
- Explosives
- Fireworks
- Matches
- Fertilizer
- Antifreeze
- Insulation
- Linoleum
- Rubber
- Textiles
- Medicines

INTERNAL ORGANS
- Instrument strings
- Tennis racquet strings
- Hormones, enzymes, vitamins, and other medical materials

MILK
- Adhesives
- Plastics
- Cosmetics
- Medicines

MANURE
- Fertilizer
- Nitrogen
- Phosphorous

CONCLUSION: THERE IS NO SUCH THING AS A VEGAN
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Less than 1500 dairy plants
- ~155 billion lbs of milk processed/year
- 40% for liquid consumption
- Most plants owned by regional corporation or cooperatives
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- ~500 woolen and worsted manufacturers
  - New England states
  - Produce and distributes a billion dollars of cloth
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D. Veterinarians

1. Establish the appropriate herd or flock health programs and aid the recovery of sick or injured animals.
   
   ▶ Dependence of the producer increases as animal units increase
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✓ Provide assistance in prevention, nutrition, and environmental management

Veterinarian Profession Facts:

- There are ~180 Vet schools in the world.
- There are ~27 Vet schools in the U.S.
- The AVMA has ~69,000 members (24.5 k small animal; 11.0 k large/mixed animal; 4.3 k research/universities/zoos; 1.4 k equine practice).
PROFESSIONAL SOCIETY ASSOCIATIONS

- American Society of Animal Science (http://www.asas.org)
- The American Veterinary Medical Association (http://www.avma.org/)
- TAMU – College of Veterinary Medicine (http://www.cvm.tamu.edu/)
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E. Animal Sciences

1. Composed of scientific disciplines in breeding & genetics, management, nutrition, biotechnology, physiology (environmental and reproductive), pathology, and meat science.
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✓ Nutrition

- study of nutrients and their utilization in improving animal health and performance
Environmental physiology

- surrounding environment and housing on animal performance (i.e., shelter, air flow, etc.)
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✓ Animal health

- control of animal diseases
- investigate the causative agent and its life cycle
- develop dewormers, vaccines, health management techniques, etc.
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Reproductive physiology

- Increase the number of live healthy offspring
- Investigate reproductive cycles, embryonic development, semen sexing, fertilization success
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✓ Breeding & Genetics

- study of genotype and phenotype, genes for traits passed from one generation to the next, breeding programs, selection practices, etc.
Role of reproductive biotechnologies in enhancing food security and sustainability

Somatic cell nuclear transfer (SCNT) involves the introduction of DNA from the nucleus of an adult somatic (body) cell into an enucleated or empty host oocyte (egg). This is now the most common procedure for cloning animals and allows numerous animals to be produced from a single donor (source: super-clone.blogspot.com).
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Governmental and Educational Agencies (USDA, FDA)
- interpret and enforce laws and regulations
- grading livestock and poultry into quality groups

- U.S. Department of Agriculture (USDA)
- Food and Drug Administration (FDA)
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Animal Science Careers
http://www.asas.org/careers.asp