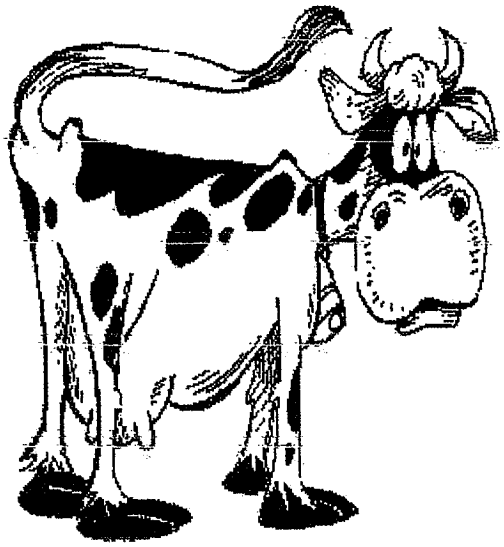


SO, WHEN IS A COW MORE THAN A COW?

Whenever we depend on its renewable resources to be part of the world that helps us.

Beef by-products enable us to use 99% of every beef animal.
BEEF BY-PRODUCTS - THE NATURAL SOURCE

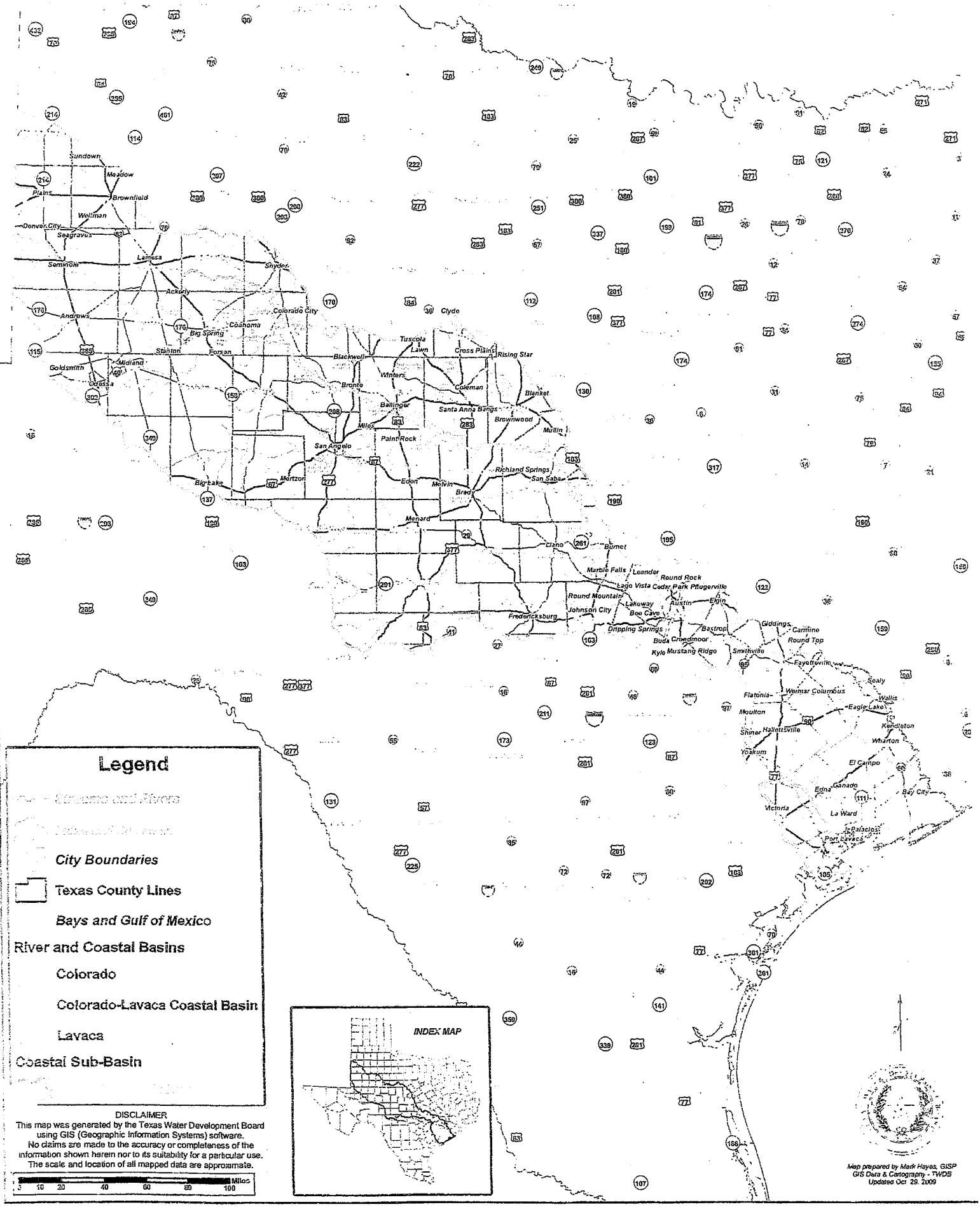
Beef by-products serve as source materials for other industries, including pharmaceuticals, chemicals, and textiles.

We normally associate beef as being part of a satisfying meal. However, because 99% of the beef animal is utilized, items manufactured from beef by-products are all around us. Yogurt, car tires, drywall and a variety of medicines all contain a beef by-product.

The medical world relies on beef by-products for many life saving or life improving medications and treatments. Our bodies can easily accept a medication or treatment made with beef by-products. Although some medical products and treatments are made from synthetic ingredients, many are still made more economically from beef cattle, thus helping to keep the cost of our health care down.

Some frequently used medical products made from beef by-products include trypsin (for cleansing wounds and ulcers), corticotrophin (for treating allergies, arthritis and respiratory diseases), iron (for treating anemia), thrombin (for blood coagulation), and a huge range of other valuable pharmaceutical products.

Colorado & Lavaca Rivers/Matagorda & Lavaca Bay System



Legend

- City Boundaries
- Texas County Lines
- Bays and Gulf of Mexico

River and Coastal Basins

- Colorado
- Colorado-Lavaca Coastal Basin
- Lavaca
- Coastal Sub-Basin

0 10 20 40 60 80 100 Miles

Map prepared by Mark Hayes, GISP
GIS Data & Cartography - TWDB
Updated Oct 29, 2009

Water for Beef Cattle

Shane Gadberry
Assistant Professor - Nutrition

Livestock require the proper balance of water, carbohydrates (energy), protein, vitamins and minerals for optimal levels of performance. Of these nutrients, water is the most critical for all classes of livestock.

Cattle have little ability to adapt to water restriction, and feed intake will be greatly reduced following only short periods without water. Because of this, a plentiful supply of good quality water is necessary for profitable beef production.

Water Requirements

Many factors influence the amount of water required by cattle. Table 1 shows average water needs for various classes of beef cattle. Note that water consumption varies considerably, depending on the temperature and stage of production. These allowances are not absolute requirements and should only be used as a guide in developing water sources or as a starting point for supplying water to penned cattle.

Water consumption is influenced by other factors, such as moisture and protein level of the feed, salt intake, relative humidity and the breed of cattle. When high moisture feeds such as silage or fresh forages are used, water intake as drinking water is reduced. Because of the need to excrete more urine, high levels of salt or protein in the feed increase water needs. In areas with high humidity, animals require somewhat less water because of lower losses to evaporation. Brahman cattle have a greater ability to adapt to hot, dry conditions than the temperate breeds of cattle, so they better withstand short-term water restriction. Because of the importance of water to body function and the difficulty in estimating requirements, cattle in all circumstances should have free access to all the quality water they will consume.

Water Quality

Quality of drinking water for both humans and livestock is a growing national issue. Some water supplies have been contaminated by agricultural chemicals or contain naturally occurring contaminants that interfere with animal performance. The purpose of this fact sheet is to provide an outline for maximum tolerable levels

Table 1. Estimated Daily Water Intake of Cattle, Gallons/Day (adapted from a table prepared by Paul Q. Guyer, University of Nebraska)

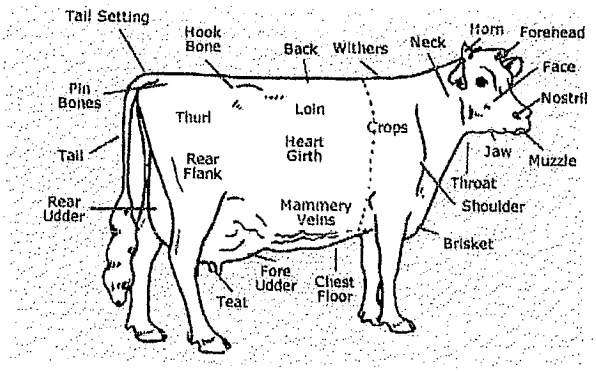
Daily High Temp (F°)	Cows Nursing Calves[1]	Dry and Bred Cows	Bulls	Growing and Finishing Cattle			
				400 lb	600 lb	800 lb	1000 lb
	Gallons/Day						
35	11	6	7	4	5	6	8
50	13	7	9	5	6	7	9
65	16	8	11	6	7	9	11
80	18	11	13	7	9	10	14
95	20	15	20	11	15	17	19

[1]First four months of lactation.

Cow Anatomy

Below is a diagram of the Anatomy of a Cow

As you can see, there are many parts to a cow. Cows vary in all different colours, some are brown, tanned, white, black, brown-white patched or black-white patched. In a female cow, milk is produced in the udders and extracted from the teats. A Cows udder has four compartments with one teat hanging from each.



Tiny Cells remove water and nutrients from the blood and convert it into milk. The milk forms into droplets and drips into a cistern which holds the milk. If the cows teat is squeezed, it produces a squirt of milk and is either saved in tanks or feeds a suckling calf.

A cows mouth is adapted for grazing, the top part of the mouth is a hard pad and the bottom part a row of flat-topped teeth. Cows have 32 teeth in all, 8 incisors on the bottom part and 6 molars on the top and bottom parts on each side.

The cow tears grass from the field and grinds it between the two mouth parts.

A cows ears are very flexible and can turn in any direction. They are especially used to hear any signs of danger from many directions.

Cows have long tails which they use to waft insects of them.

Bulls have horns, although some female cows have small horns too. Bulls horns are made out of similar material to our fingernails called 'Keratin'. Bulls horns can be removed without causing the cow any discomfort.

Diet: Cows are herbivores which means they do not eat meat, only plants, grass and cereal. Cows are ruminant animals which means they have more than one stomach.

Cows have a four part stomach, each part used for a different process.

Cows swallow their food without chewing it too much at first. Cows later regurgitate a 'cud' which is then chewed well and swallowed.

Cows at Animal Corner.

Cows

Cows are members of the sub-family 'Bovinae' of the family 'Bovidae'. This family also includes Gazelles, Buffalo, Bison, Antelopes, **Sheep** and **Goats**.

Cows are raised for many reasons including: milk, cheese, other dairy products, also for meat such as beef and veal and materials such as leather hide. In older times they were used as work animals to pull carts and to plow fields.

In some countries such as India, cows were classed as sacred animals and were used in religious ceremonies and treated with much respect.

Today, cows are domesticated ungulates (hoofed animals with two toes on each hoof) that we see very often chewing the grass in farmers fields as we walk or drive through the countryside.

There is an estimated 1.3 billion head of cattle and 920 breeds of cow in the world today. Cows are referred to as the 'fosters mothers to the human race' because they produce most of the milk that people drink.

The mature female of the species is called a '**cow**'.

The mature male of the species is called a '**bull**'.

A group of cows is called a '**herd**'.

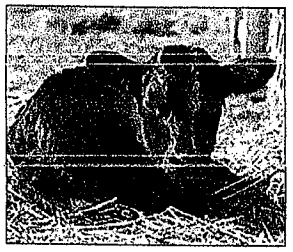
A young female cow is called a '**heifer**'.

A baby cow is called a '**calf**'.

A cow spends up to 6 hours a day eating. Cows spend over 8 hours a day chewing thier cud which is regurigated, partially digested food. Cows each drink equivalent to a bath tub full of water a day.

Cows occupy a unique role in human history. Cows have been considered one of the oldest forms of wealth. Cows have always been of interest to man because of their amazing ability to be able to provide meat and dairy products, have been strong animals to work with and also reproduce themselves while eating nothing but grass. Amazing!

Cow Reproduction



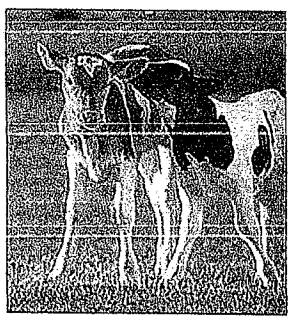
The average cow is 2 years old when she has her first calf. Calves are fed from the cow until they are between 8 and 9 weeks old. It is essential for a calf to be fed their mothers milk from the start as it contains antibodies that protect the new calf from diseases. Two months before giving birth, a dairy cow takes a rest from giving milk in order to grow her calf.

During this period the cow is known as a Dry Cow. When a dairy cow gives birth, this process is called a freshening. All calves are born with horn nubs. It is common for a vet to remove these nowadays.

A young female calf is called a heifer, she is called this until she has her first calf. A young male is called a bull calf.

Did you know that cows never forget their calves. It is quite common to see them licking their grown calves just as they did when they were young.

How to determine the age of a cow



The age of a cow is determined by examination of the teeth and less perfectly by the horns. The temporary teeth are in part erupted at birth and all the incisors are erupted within twenty days. The first, second and third pairs of temporary molars are erupted in thirty days. The teeth have grown large enough to touch each other by the sixth month. They gradually wear and fall in eighteen months. The fourth permanent molars are through at around the fourth month.

The fifth at the fifteenth month and the sixth at two years. The temporary teeth begin to fall at twenty-one months and are entirely replaced by the thirty-ninth to the forty-fifth month.

Interesting Cow Facts

- The oldest cow ever recorded was a Dremon Cow named 'Big Bertha' who died 3 months just before her 49th birthday on New Years Eve, 1993.

Cows Milk

A cow must have her first calf before she can start producing milk. Cows are milked on average for about 3 - 4 years. Dairying has come along way over the years. Today, one cow can produce the milk it once took ten cows to produce.

The average cow can produce 10 gallons of milk a day. A cow can produce over 200,000 glasses of milk in her lifetime. Cows milk is a concentrated food that is full of vitamins, especially calcium and is very good for you although Goats milk is known to be better..

An 8 ounce glass of milk contains the following nutrients:

17% Protein

29% Calcium

23% Phosphorus

23% Riboflavin

25% Vitamin D

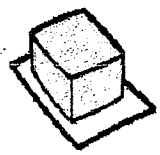
15% Vitamin B-12

Refrigeration came into use in 1880 and the first pasteurizing machine was introduced in 1895. The milk bottle was invented in 1884. Plastic milk containers were introduced in 1964.

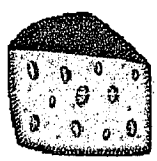
Before milking machines were invented in 1894, farmers could only hand milk about 6 cows per hour. Today, farmers use automated machines to milk more than 100 cows per hour.

It takes 12 pounds of whole milk to make one gallon of ice cream. A dairy cow can produce five gallons of ice cream in one day.

It takes 21.2 pounds of whole milk to make one pound of butter. The natural yellow colour in butter comes from the beta-carotene present in the grass that the cow grazes on.



It takes 10 pounds of milk to make one pound of cheese. Cheese was first made more than 5,000 years ago. There are more than 1,500 different kinds of cheese made from the milk of cows, goats, sheep, and other animals.



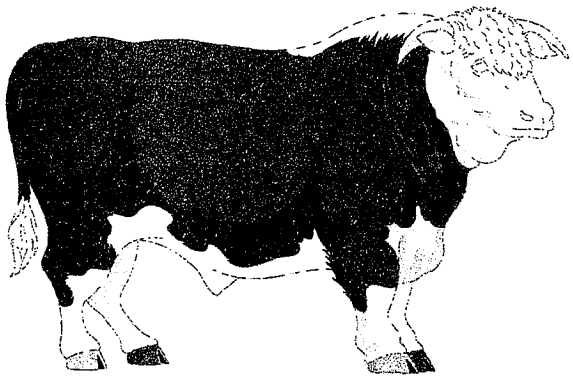
Milking History

Until the late 1800s, the milking of the cow was done by hand. In the United States, there were several large dairy operations in some northeastern states and in the west,

Oregon Agriculture in the Classroom Foundation

Bring a Classroom to Life!!

Cattle By-Products



From Hide and Hair

- Baseball gloves
- Car upholstery
- Drum heads
- Leather coats
- Violin strings
- Shoes
- Felt hats
- Luggage
- Wallets
- Leather watchbands
- Rawhide softballs

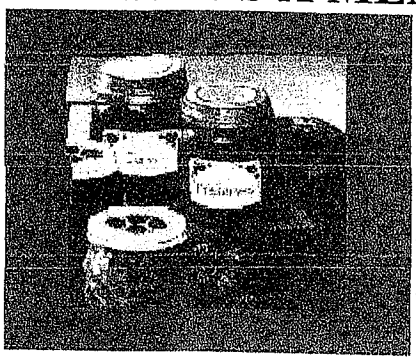
From Bones and Horns

- Bone china
- Ice cream
- Piano keys
- Candies
- Knife handles
- Vitamin capsules
- Chewing gum
- Lipstick
- Wallpaper paste
- Combs
- Photo film

From Glands and Organs

- Asphalt
- Cosmetics
- Fertilizer
- Insulation
- Livestock feed
- Medicines
- Paint
- Plastic
- Soap
- Tires

WHEN IT'S A MEAL



Most people usually think of beef as a hamburger, steak or delicious roast for a satisfying and nutritious meal. There are other edible parts in addition to the protein-packed and mineral-rich muscle. The variety meats such as liver, heart, tongue, kidneys and sweetbreads are just a few of the tasty alternatives used in gourmet dishes.

There are some edible by-products that are not quite so obvious. Did you know that the gelatins in products such a ice cream and yogurt are made from the bones of the cow?

Cattle provide a portion of the ingredients of many manufactured products; like chewing gum. It is like baking a cake - you need all the ingredients to make the product work.

Take a look at some basic edible goods that may contain beef by-products:

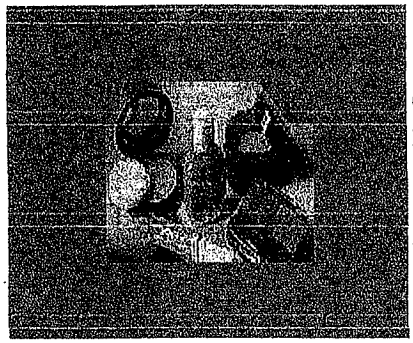
Blood Sausage	Marshmallows	Candies
Mayonnaise	Chewing Gum	Oleo shortening
Clarification agent for Paté, juice, wine & beer	Sausage casings	Comsommé
Yogurt	Cookies	Head Cheese
Gelatin in Salads	Ice Cream	"Light" Products

and How about these variety meats

Liver	Heart
Tongue	Kidneys

Even inedible by-products of beef cattle are used to feed other animals. Beef fat, protein and bone meals are used in feeding poultry, pork and

WHEN IT'S A HOUSEHOLD



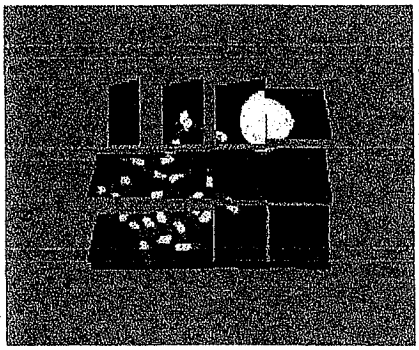
"What do cows have to do with me? I don't have one eating grass in my backyard!" This might be your first reaction to the statement above. However, items manufactured from inedible beef by-products surround us in our daily environments. The soap you washed your face with this morning; the baseball equipment in the closet; even the sheet rock and the paint on the walls of your home - all of these contain a by-product which is derived from cattle! When you take a photograph of a friend or some beautiful scenery you are using a beef by-product. Silver halide crystals are the active agent that makes modern photography work. But you have to hold them in place somehow, so gelatin (a beef byproduct) is used to hold the silver halide crystals on the plastic backing to produce the familiar photographic films that we use today.

How many of these are a part of your everyday life?

bone china	leather sporting goods	bonemeal biscuits
luggage	boots and shoes	paints
candles	pet foods	cosmetics
crayons	photographic film	plastics
deodorants	shampoo/cream rinses	detergents
soaps	shaving cream	doggie chews
textiles	fabric softeners	floor wax
toothpaste	glue	upholstery
insecticides	violin strings	

Did you know that it takes 3,000 cows to supply the National Football League with enough leather for a year's supply of footballs. Now, why do they call it the ol' pig skin?

WHEN IT'S A PHARMACY

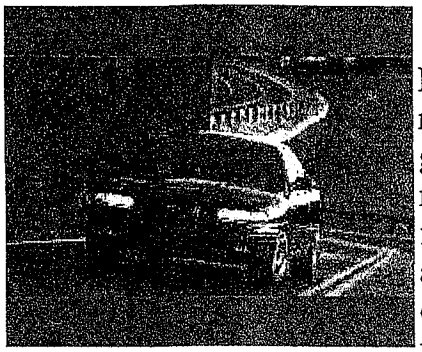


The medical world also relies on many by-products for the pharmaceutical wonders it produces and uses. Cattle have great similarities in organic chemical structure to humans. Our bodies will easily accept a medication or treatment made with these components. Some of these products are synthesized, but many are still made from beef animals because they are much more economical without sacrificing quality, whether they are used in surgery, research, or routine health care.

Here is a listing of drugs derived from cattle and what they are used for:

Insulin	- treatment of diabetes
Heparin	- used in treatment of allergies, rheumatoid arthritis, rheumatic fever, and respiratory diseases
Thyrotropin	- stimulates the thyroid gland
Parathyroid Hormone	- used to treat parathyroid deficiencies
Thrombin	- promotes coagulation during surgery
Glucagon	- treats hypoglycaemia
Sodium Levathyroxine	- thyroid replacement therapy
Trypsin & Chymotripsin	- cleansing wounds and ulcers
Deoxyribonuclease	- acts against devitalized tissue in purulent (discharging pus) states
Fibrinolysin	- treatment of blood clots within the cardiovascular system
Pancreatin	- treatment of infants with celiac disease (gluten intolerance) and related pancreatic deficiences
Thyroid	- treats myxedema (metabolic disease caused by deficient action of the thyroid gland) in adults and cretinism (deformity and mental retardation caused by thyroid deficency) in children

WHEN IT GETS US THERE

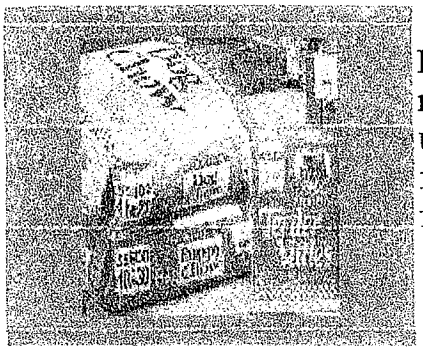


By-products are used in all types of mechanical items to get us where we're going. Chemical manufacturers use numerous fatty acids from inedible beef fats and proteins, for all sorts of lubricants and fluids. Antifreeze contains glycerol derived from fatty acids to keep your car running cool. Tires have stearic acid which makes the rubber hold its shape under continuous surface friction. Glue from colloidal proteins has been used in automobile bodies. Even the asphalt on our roadways has a binding agent from fat.

Some other important products that contain beef by-products:

hydraulic brake fluid
airplane lubricants and runway foam
various machine oils and viscous fluids
steel ball bearings containing bone charcoal
car polishes and waxes
textiles for car upholstery
ashphalt

WHEN IT IS INVOLVED IN INDUSTRY



By-products are used in all sorts of mechanical items. Chemical manufacturers use numerous fatty acids from inedible beef fats and proteins for all sorts of lubricants and fluids.

I'll bet you know about some of these products

Animal Feeds	Cement Blocks
Industrial Cleaners	Lubricants
Molds for Plastics	Explosives
Printing Ink	Fertilizers
High Gloss for magazines	Whitener for paper