The Context
The Fatted Steer

Rain-fed beef. Since the 1950s, that term has conjured up thoughts of tender, juicy, delicious meat. Grain-fed beef is advertised by supermarkets and featured by restaurants. Omaha Steaks, a national retail and mail order company, proclaims: “We select the finest grain-fed beef for superior marbling, flavor and tenderness.” Morton’s, the high-end steakhouse chain, “serves only the finest USDA prime-aged, Midwest grain-fed beef.” And the latest epicurean delicacy, Kobe beef—advertised as the “most flavorful and tender beef on the Planet”—is fed grain (and often beer).¹ The implication is that beef from cattle that were not grain-fed is tough, tasteless, and simply not worth eating.

In truth, grain-fed beef, which accounts for some 85 percent of American beef, epitomizes much of

- Grain-fed beef is rich in saturated fat and cholesterol, which promote heart disease.
- Growing corn and other crops for cattle feed requires enormous amounts of fertilizer, water, pesticides, land, and fossil fuel.
- Feedlot cattle eat a grain-rich diet that can cause digestive, hoof, and liver diseases and necessitates the continuous feeding of antibiotics.
- Grass-fed cattle are less harmful to the environment and provide leaner beef, but still generate air pollution. Any kind of beef increases the risk of colon cancer.
what is wrong with both the American “factory” approach to livestock production and the American diet. They eat a diet that sickens them. They generate air and water pollution. They pack on fatter meat. And, to top it off, grain-fed beef doesn’t necessarily taste better than grass-fed beef.

A sensible argument for raising cattle and other ruminants is that their manure fertilizes grasslands, and they can convert into meat or milk the nutrient- and fiber-rich plant matter—grasses, cornstalks, and the like—that humans cannot digest. Raising cattle that way, though not without problems of its own, expands the food supply. However, in the United States, that rationale for including beef in the diet is undercut by the fact that the great majority of beef cattle spend months in feedlots eating grain, getting fat, and generating pollution.

The Objective: Cheap and Tender Beef

Restaurateur and former professional football player Dave Shula’s “Views on Great Beef” include the note that “A great steak is all about flavorful, juicy and tender beef.” And an animal physiologist with the U.S. Department of Agriculture (USDA), discussing why he studies cattle proteins and genes, explains that “Tenderness is the most important trait to consumers.”

The cattle industry certainly wants to satisfy consumers’ desires—and maximize its profits. Fortunately for the industry, techniques that produce tasty meat also turn out to be the cheapest way to raise cattle. The high-energy diets dished out at feedlots speed the animals’ growth, with much of the increased weight taking the form of fat. Much like a restaurant that tries to “turn” its tables as quickly as possible, the faster growth rate gets the cattle to market sooner. So with both gastronomic and financial motives in place, cattle producers have adopted practices that yield a very fatted steer indeed.

Choosing to Produce Lean or Fatty Beef

For thousands of years, farmers have employed such factors as breeding and feed to shape the nature and yield of the meat (or milk or pork or chicken). In recent decades, scientists and agribusiness firms have turned the art of meat production into a science, with careful research supplanting happenstance.

Unfortunately, the practices that lead to the fastest production and cheapest prices are not what’s best for the consumer’s health.

They Are What Their Parents Are

Breed is a major determinant of cattle’s fat content. Angus, Hereford, and crosses with other breeds are the most popular breeds in the United States, not least because they are among the fattiest. They have the largest amounts
The Fatted Steer

The Fatted Steer

of external fat and the highest marbling scores, and they provide the highest percentages of Choice meat (see figure 1). The Limousin and Chianina breeds are far leaner. In Italy, in fact, the Chianina breed is prized for its lean meat. In the United States, it is often crossbred with other cattle—such as the Hereford—to increase marbling in the Chianina or decrease back fat in the Hereford.

They Are What They Eat

What cattle are fed greatly influences how fatty their meat will be. In a study at Ontario’s University of Guelph, Ira Mandell and his colleagues let Limousin calves graze for eight months. The cattle were then fed either grain or mostly alfalfa hay for seven months (see table 1). The average carcass weight of the grain-fed steers was 45 pounds more than that of the hay-fed steers, reflecting faster growth on a high-energy diet. The layer of back fat over the longissimus muscle (the main muscle in rib and strip loin cuts) was twice as thick in the grain-fed steers. And meat from the grain-fed steers contained almost twice as much intramuscular fat. The hay-fed steers, on the other hand, produced more lean meat than their grain-fed counterparts.

Quality and Yield: Understanding USDA Meat Grades

Because fat content is important to beef purchasers, the U.S. Department of Agriculture has established a complex grading system that gives high grades to beef that is well-marbled with intramuscular fat. About 80 percent of all beef cattle and cows are graded by visual inspection at the slaughterhouse. The fattiest meat (8 percent marbling or higher) rates as Prime, the next fattiest (5 to 7 percent marbling) as Choice, and the leanest meat (3 to 4 percent marbling) as Select. In recent years, about 40 percent of cattle were graded as Select, 60 percent as Choice, and 2 to 3 percent as Prime. Restaurants and supermarkets pay a premium for that fatty Prime meat. Producers also receive a premium for such special USDA grading programs as “Certified Angus Beef” or “Certified Hereford Beef,” which are breeds that yield mostly high-Choice beef (see figure 1).

“External” fat—that is, fat outside of the edible beef used as steaks—is reflected in USDA’s “yield grades.” The lower the grade on a scale of 1 to 5, the less fat. Of meat that is graded, 85 percent is USDA yield grade 2 or 3. Although some producers argue that the quantity of external fat is unimportant because most of it is trimmed from beef cuts, much of that fat eventually ends up back in the food supply when it is blended with lean ground beef or used as shortening in baked goods.

An even leaner grade of beef, Standard, represents only 0.3 percent of all meat that is graded.
While some breeds are inherently higher in fat, they will be leaner if they graze on pasture. In a study conducted at North Carolina State University, Angus steers were kept on pasture or fed corn until they weighed about 1,200 pounds (see table 2). The grass-fed steers took about 1½ months longer to reach that weight, and their meat contained much less fat marbling than that from the grain-fed steers: Grass-fed beef was on the lean side of USDA Select, while grain-fed beef was on the high side of USDA Choice. Although the average carcass weight of the grass-fed steers was 75 pounds less than that of the grain-fed steers, the area of their longissimus muscle was almost as large as that of the grain-fed steers—a sign that grass-fed cattle can yield almost as much edible meat as grain-fed cattle. Moreover,

**Table 1. Carcass traits of Limousin steers fed grain or hay for 209 days**

<table>
<thead>
<tr>
<th>Carcass trait</th>
<th>Grain-fed steers</th>
<th>Grass-fed steers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcass weight</td>
<td>720 lb</td>
<td>674 lb</td>
</tr>
<tr>
<td>Total fat</td>
<td>27%</td>
<td>19%</td>
</tr>
<tr>
<td>Intramuscular fat</td>
<td>4.0%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Back fat over longissimus muscle at slaughter</td>
<td>0.4 in</td>
<td>0.2 in</td>
</tr>
<tr>
<td>Lean meat</td>
<td>395 lb</td>
<td>409 lb</td>
</tr>
</tbody>
</table>

**Notes:** All carcass weights were about 700 pounds.
the lower yield grade indicates that the grass-fed beef had less low-value external fat.

An animal’s diet can override the effect of breed. Feeding grain to a leaner breed of cattle over longer periods can result in meat that is as fatty as that produced by a fattier breed. The University of Guelph researchers compared the Red Angus breed with the leaner Simmental. Both groups of animals were finished with a high-grain diet and slaughtered when they reached the same back-fat thickness (about 0.4 inches, determined by ultrasound). The Simmental took about 2½ months longer than the Red Angus to reach the same amount of back fat and, thus, spent substantially more time on feed grains. The Simmental outweighed the Red Angus at slaughter by 45 pounds, and, despite its “lean” reputation, had a slightly higher marbling score and total (external and internal) fat content. So, just because meat comes from a normally lean breed does not automatically mean that the meat is lean.

**Younger Is Leaner**

The age at which cattle are slaughtered strongly affects fat content. In a study led by Susan Duckett at the Oklahoma State University Meat Laboratory, grain-fed Hereford-Angus cattle were slaughtered after 28-day intervals on high-energy diets. After periods longer than 84 days, cattle progressively accumulated wasteful, external fat without increases in the palatability (taste, juiciness, and tenderness) of their meat. Between 84 and

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**Table 2. Carcass traits of Angus steers fed grain or grass and slaughtered at similar weights**

<table>
<thead>
<tr>
<th>Carcass trait</th>
<th>Grain-fed steers</th>
<th>Grass-fed steers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days on diet</td>
<td>91</td>
<td>133</td>
</tr>
<tr>
<td>Weight at beginning of experiment</td>
<td>896 lb</td>
<td>909 lb</td>
</tr>
<tr>
<td>Slaughter weight</td>
<td>1,260 lb</td>
<td>1,190 lb</td>
</tr>
<tr>
<td>Carcass weight</td>
<td>750 lb</td>
<td>675 lb</td>
</tr>
<tr>
<td>Marbling score*</td>
<td>6.2</td>
<td>4.5</td>
</tr>
<tr>
<td>USDA quality grade†</td>
<td>17.5</td>
<td>15</td>
</tr>
<tr>
<td>USDA yield grade‡</td>
<td>3</td>
<td>2.2</td>
</tr>
<tr>
<td>Longissimus muscle area</td>
<td>13.1 sq in</td>
<td>11.9 sq in</td>
</tr>
</tbody>
</table>

* Scoring system designed by researchers to match USDA’s scoring system: 4 = slight degree of marbling; 5 = small; 6 = modest; 7 = high.

† Scoring system designed by researchers to match USDA’s scoring system: 16 = Select; 17 = Choice; 18 = High Choice.

‡ Yield grade is measured on a scale of 1 to 5, with 5 containing the highest amount of waste fat.
112 days on feed grains, the cattle experienced the largest increase in external fat and marbling. During that period, the content of intramuscular fat more than doubled, moving the meat from USDA Select to Choice. Those results suggest that limiting grain feeding to 84 days—many cattle are on feed for up to 190 days—could provide much more healthful meat.

**Fatty Meat Clogs Arteries...**

Fattening cattle on grain is the quickest way to get them to market, but the higher fat content of feedlot beef is life threatening. Beef is a major source of saturated fat and cholesterol, which increase levels of the harmful kind of cholesterol in our blood. That clogs arteries and increases the risk of heart attacks, the nation’s number-one cause of death. While consumers can easily cut away the outside fat on steaks, they can’t remove the fat that marbles steaks or the fat in hamburgers and meatloaf.

Grass-fed beef is usually lower in fat and less conducive to heart disease. But, as we will discover in the next chapter, any kind of beef—especially processed meats such as sausages—promotes colon cancer.

**...And Doesn’t Necessarily Taste Better**

Americans have been trained to salivate at the mention of grain-fed beef. “This creates well-marbled, tender, flavorful steaks. Marbling is the easiest way to spot a high quality steak,” says Iowa Corn Fed, a mail-order company that charges as much as $35 a pound for a steak. One study found that pasture-raised beef sometimes has a “grassy” off-flavor. A University of Nebraska study found that half the taste testers preferred corn-fed beef, but the other half either preferred Argentinian grass-fed beef or were undecided.

Taste experts agree that corn-fed beef tastes different from grass-fed beef, but not necessarily better. Corby Kummer, food editor for the *Atlantic Monthly*, says “Grass-fed beef tastes better than corn-fed beef: meatier, purer, far less fatty, the way we imagine beef tasted before feedlots and farm subsidies changed ranchers and cattle.” Careful, moist cooking, such as using marinades, helps reduce any stringiness.

Many studies dispute Kummer, presumably because taste is subjective and tasters bring with them their expectations of what tastes good. But some of the studies make a case for grass-fed beef. Mandell and his colleagues at the University of Guelph compared meat from the popular Hereford breed and the leaner Simmental breed. Cattle of each breed were fed mostly grass or mostly grain. A trained taste panel judged meat from both breeds—whether they ate grain or grass—to be equally palatable.
Another study—sponsored in part by the National Cattlemen’s Beef Association—found that among top loin, top sirloin, and top round steaks, consumers showed barely any preference for the fattier Choice grade over Select. The study, conducted by Texas A&M University researchers, found that the more often consumers purchased leaner meat, the less able they were to distinguish among quality grades. They concluded that the “USDA quality grade may be limited” in indicating the taste of a steak. Taste is more culturally determined than genetically determined. It’s no surprise, then, that people prefer the kinds of beef they grew up with: fatty grain-fed in the United States and lean grass-fed in Argentina (the biggest beef-consuming country in the world). But we suspect that many more consumers would enjoy grass-fed beef if they both tasted it and were told of its health and environmental advantages.

Although beef production is geared to delivering fattier Choice or Prime meat, some health-conscious consumers are seeking leaner meat. Some companies, such as Laura’s Lean Beef, pay ranchers a premium for cattle that yield leaner Select grade beef. Other ranchers, such as Maverick Ranch and Coleman, market grass-fed or organic beef, which is often leaner than regular beef, and are getting a premium for it. For example, Hawthorne Valley Farms, which boasts several hundred acres of lush pastureland, charges up to $20 per pound for grass-fed tenderloin steaks at local farmers’ markets. In response to this growing consumer demand, even the Cattlemen’s Beef Board sometimes highlights the low fat content of certain steaks.

Raising Cattle Harms the Environment...
Raising tens of millions of cattle not only provides meat that promotes heart disease and sometimes causes food poisoning (see Arguments #1
Grass-Fed Beef: Better, but Not a Health Food

Grass-fed beef is typically leaner than feedlot beef, a major advantage; and grazing on pasture spares the need for about 5,000 pounds of grain per animal. Beyond that, some advocates maintain that grass-fed beef is rich in two special kinds of fat—conjugated linoleic acid (CLA) and omega-3 fatty acids—that confer health benefits. One purveyor, American Grass Fed Beef, emphasizes that its “grass fed beef is high in heart friendly essential fatty acids.” As yet, however, the evidence for such benefits is scanty, and even lean beef modestly increases the risk of heart disease and promotes colon cancer.

Conjugated Linoleic Acid

In the early 1980s, scientists suggested that CLA in beef might help fight obesity and prevent cancer. However, studies over the past two decades generally have been unsuccessful in linking the consumption of grass-fed beef to those “near-magical” (as one skeptical scientist stated) results.

- Weight gain. Michael Pariza—the University of Wisconsin scientist who first identified CLA in beef and heralded its possible benefits—found that CLA reduces weight gain in laboratory mice, with possibly smaller benefits in other lab animals. However, Pariza notes that the fat mostly reduces future weight gain, not the initial weight. An industry-sponsored study suggests that CLA might lower the percentage of body fat, but not weight. An added complexity is that meat and dairy products contain one form of CLA, while dietary supplements contain an additional form. Only the form in supplements affects weight in animals.

The bottom line is that human studies have not shown a benefit, and some research indicates that supplements may increase the risk of diabetes, heart disease, and other problems. In 2002, the Institute of Medicine, a part of the and #2), but also wreaks environmental havoc, as detailed in Arguments #3, #4, and #5. A mid-sized feedlot with 10,000 cattle churns out half a million pounds of manure each day—equivalent to a city such as Washington, D.C., with 500,000 residents. That mountain of fragrant manure pollutes the air and sometimes pollutes streams and rivers, killing plants and animals. The methane that cattle and their manure produce has a global-warming effect equal to that of 33 million automobiles.
National Academy of Sciences, stated that “research on the effects of CLA on body composition in humans has provided conflicting results” and declined to set a recommended intake level. Overweight individuals should run—but not to grocery stores for grass-fed beef or drug stores for supplements.

• Cancer. When female rats predisposed to mammary (breast) tumors were fed a diet containing 0.5 percent to 1 percent CLA, existing tumors grew more slowly or stopped growing, and fewer new tumors developed. Also, the tumors did not spread to other organs. In 1989, *USA Today* opined that beef “aids [the] war on cancer” and could “be made into a drug” if CLA proved beneficial to humans. But the Institute of Medicine threw cold water on that notion, too, saying that “to date, there are insufficient data in humans to recommend a level of CLA at which beneficial health effects may occur.” Even if beef’s CLA turns out to protect against cancer, grass-fed beef’s lower fat content—its real health advantage—would reduce the benefits from the higher content of CLA in its fat.

Overall, the evidence that CLA offers health benefits is skimpy. And if CLA ever were proven to offer benefits, doctors certainly would prescribe pills, not burgers.

**Omega-3 Fatty Acids**

Some people claim that grass-fed beef is especially healthful because it contains about five times as much omega-3 fatty acids as grain-fed beef. Those are the same fatty acids—eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA)—that are found in fish oil and appear to prevent heart attacks and possibly strokes. Beef also contains small amounts of alpha-linolenic acid, some of which the body can convert to EPA and DHA. But the amounts of all of those fatty acids are small.

The American Heart Association recommends that people without heart disease eat fish twice a week, as well as flaxseed, canola, and soybean oils. People with heart disease should consume about 1 gram of EPA and DHA per day. To get that amount from grass-fed beef would mean eating about 5 to 10 pounds of rib steaks. Clearly, fish and dietary supplements are better sources: Three ounces of bluefin tuna provide 1.5 grams of the fatty acids; 3 ounces of Atlantic salmon provide 1.9 grams.

Feeding grain to cattle makes a bad situation worse. It takes about 7 pounds of corn to put on 1 pound of weight. That’s why over 200 million acres of land are devoted to producing grains, oilseeds, pasture, and hay for livestock. Moreover, cultivation of those crops requires 181 million pounds of pesticides, 22 billion pounds of fertilizer, and 17 trillion gallons of irrigation water per year. The fertilizer and pesticides pollute the air, water, and soil, while irrigation depletes natural aquifers built up over millennia.
One measure of our humanity is how well we treat animals. While pets, of course, are often pampered almost like children, livestock are another story. Aside from sometimes being branded with a burning hot iron and, in the case of males, castrated without the benefit of sedation or painkillers, beef cattle have a pretty good life for their first year or so, living on the range. But then virtually all cattle are shipped in crowded trucks—exposed to the elements and banged about—to feedlots, where they dwell for up to six months in manure-befouled pens and eat a high-energy corn-based diet that sometimes causes liver, hoof, and gastrointestinal illnesses and occasionally even fatal bloating. (Shipping the animals to the feed is cheaper than hauling the feed to them. Indeed, in the case of chickens, corn and soybean meal account for 60 percent of the cost of production.)

When they’ve reached market weight, feedlot cattle (along with small numbers of pasture-raised cattle) are shipped for the final time to a slaughterhouse where they have a small, but real, risk of a slow, painful death. From that point on, the cattle exact a sort of posthumous revenge: First to suffer are the workers in slaughterhouses and meat processing plants who experience everything from repetitive movement injuries to knife wounds. Next are the unwitting consumers, who may suffer foodborne illness in the short term or fatal heart attacks in the long term.

### What It All Means

Raising cattle provides valuable nutrients, leather, and by-products used by the food and drug and other industries. But considering how most cattle are raised, those positives are outweighed by a host of negatives. To protect our own health and our country’s environment, the best thing we could do would be to eat less, leaner, or no beef. Should that happen on a large enough scale, vast areas of cropland could be freed up, allowing the land to...
regain much of its original fertility and biodiversity or to be planted in more healthful fruit and vegetable crops or crops that would provide biofuel.

But as long as people do eat beef, raising cattle on pastureland—instead of feeding them grain—would dramatically reduce the fat content of beef, the waste and pollution of water and the fouling of air caused by manure and agricultural chemicals, and the misery experienced by the cattle consigned to feedlots.