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The Safety of Raw versus Pasteurized Milk

It is very difficult to get a man to understand something when his salary depends on not understanding it.

Upton Sinclair

Several issues are central to the controversy about raw milk in America today. Some are scientific and some essentially legal. Even the scientific issues are shrouded in legalities and politics, but we'll approach them in a straightforward and practical manner. One issue is the question of safety: How safe is raw milk? We'll answer that question by considering the historical records of both raw and pasteurized milk as agents associated with disease, and by looking at scientific evidence about how microbes in milk may lead to disease in susceptible individuals.

Another scientific issue involves the health benefits of raw milk compared to pasteurized—a subject that has been explored in many of the preceding pages. We'll look at this issue again in Chapter 16 as we explore why and how green pastures and contented cows produce nature's most nearly perfect food.

Legal issues surrounding the raw milk controversy are complex and many of their ramifications are beyond the scope of this book. But we'll consider a number of practical questions. Is the alleged evidence about the dangers of raw milk so strong that the government should prohibit its being

sold or even given away, as indeed has been done in some states and countries? Even more fundamental, does our constitutional government have the right to make laws that outlaw a food that has sustained much of humanity before and throughout recorded history? In the face of restrictive and unfair laws, what legal structures exist that may allow dairy farmers to legally make raw milk products available to consumers for reasonable compensation? How are producers and consumers of raw milk working together to change those laws that prevent farmers from selling raw milk and its products on the open market?

The answers to these questions are shaping the way a determined minority of Americans has built a grassroots movement to make a ready supply of raw milk and its products available for themselves, their families and anyone else who desires it. These committed individuals—the farmers, the consumers and their leaders, the alternative medical practitioners and their patients, the writers, the local, state and federal government representatives and others in public life—and the legal issues they are confronting are the subject of Chapter 16. For now, we consider the more straightforward matter: the safety of raw versus pasteurized milk.

PUBLIC HEALTH AUTHORITIES, THE MEDICAL ESTABLISHMENT AND RAW MILK

The position of the public health and conventional medical communities on raw milk is unequivocal: they are dead-set against it. In 1986, an FDA ruling banned the interstate shipment of raw milk, butter and cream across state lines. For many years, officials in every state have pushed for laws banning all sales of raw milk, with strong support from the Centers for Disease Control and the FDA. Within the last twenty years, all sales have become illegal in many states, or have been restricted to the farm where the milk is produced.

Off-farm retail sales of raw milk are now legal only in a handful of states; about 35 states allow farmers to sell raw milk on the farm, and 15 have made illegal all sales anywhere. A number forbid farmers to even give away raw milk.

The current situation is chaotic and unsatisfactory for nearly everyone concerned. The states that license specific farms to produce raw milk

call for rigorous programs of farm inspection and laboratory analysis. This guarantees that the milk is produced with care and meets stringent bacteria count standards. But in states that allow any dairy farm to sell raw milk on the farm, there are no special standards for that milk beyond those that apply to the vast majority of the farm's milk that is sent to pasteurization plants for processing. On many farms, particularly the larger facilities where cows spend little or no time out at pasture eating fresh green grass, the milk typically contains relatively large amounts of bacteria, sometimes including pathogenic bacteria. Such milk drunk raw sometimes leads to acute gastrointestinal illnesses.

Occasionally, a dairy family—many of whom drink their own milk raw—becomes ill. This is quite unusual, despite sometimes relatively high bacterial counts and the presence of pathogenic bacteria, in part because individuals regularly consuming raw milk build up immunity to pathogens.^{1,2} Occasionally, people purchasing raw milk on the farm, or given raw milk during visits, have become ill. And on quite a number of occasions, pasteurized milk has led to widespread outbreaks of illness (for example, the 1985 *Salmonella* outbreak in the Midwest that sickened some 200,000 people and led to 18 deaths, as detailed in Chapter 11).³

Illness associated with consuming raw milk has been relatively infrequent in the states licensing the sale of raw milk, but there have been occasional instances. During the last ten years, small isolated outbreaks of mild gastrointestinal illness in raw milk drinkers occurred in Oregon, Washington and Arizona. These were cited as proof that no raw milk is safe. Public health and medical spokesmen then declared the need to ban all raw milk to protect the public's safety, leading to a ban on the retail sale of raw milk in these states. (Oregon also banned on-farm sales, except for small farms with three cows or nine goats or less.)

An outright ban has been the goal of public officials for the last 50 years. It's worth examining why these people do what they do, given the great influence they have with the public and with the government officials and elected representatives who control policies.

The scope of food-borne illness in the United States is vast. Eggs contaminated with *Salmonella*—we looked at how nearly all eggs are produced in Chapter 11—are said by some authorities to sicken 300,000 and

kill hundreds of Americans each year.⁴ A nationwide study published by the USDA in 1996 found that 7.5 percent of the ground beef samples taken at processing plants were contaminated with *Salmonella* and 11.7 percent were contaminated with *Listeria*.⁵ In contrast with the situation in this country, over 40 years ago Sweden began a program to eliminate *Salmonella* from its livestock, and only about 0.1 percent of Swedish cattle harbor *Salmonella* today. *Salmonella* has also been almost completely eliminated from Swedish eggs.⁶

It's not just *Salmonella* and *Listeria* that taint American meat and processed foods. Thirty percent of ground beef samples taken at processing plants were contaminated with the pathogen *Staphylococcus aureus* and over half with *Clostridium perfringens*. "All of these pathogens can make people sick," wrote Eric Schlosser in *Fast Food Nation*. "Food poisoning caused by *Listeria* generally requires hospitalization and proves fatal in about one out of every five cases. In the USDA study, 78.6 percent of the ground beef contained microbes that are spread primarily by fecal material. The medical literature on the causes of food poisoning is full of euphemisms and dry scientific terms: coliform levels, aerobic plate counts, sorbitol, MacConkey agar and so on. Behind them lies a simple explanation for why eating a hamburger can now make you seriously ill: There is shit in the meat."⁷

Many of our public health and medical officials would like to rectify these problems, but are powerless to do so. They would find it as difficult as you or I would to take on the rich, powerful and highly influential corporations that control the meat and milk industries. Raw milk, on the other hand, produced by a literal handful of small farmers, is an easy and historically vulnerable target. Thus we have the rather odd situation of scores of local, state, and federal public health workers investigating "outbreaks" of generally mild gastrointestinal illness in often only a handful of individuals who may have become ill because they drank raw milk. The subsequent medical journal articles detail the findings and declare that the complete banning of all raw milk sales would be another milestone in the annals of public health. The public meanwhile continues to consume feces in most of their hamburgers as the substantial public health problems associated with industrialized agriculture are largely ignored.

This is not to say that illness occasionally associated with raw milk is always mild or, even when it is mild, is not a legitimate concern of public health and medical officials. Some individuals with severely compromised immunity (typically from taking prescription drugs) have become seriously and acutely ill after drinking raw milk. (On the other hand, a number of alternative medical practitioners, including myself, have found that raw milk has greatly benefited their immunocompromised patients.) A few times, groups of people, including children, have become ill after drinking raw milk (normally sent for pasteurization) during visits to dairies.

But these incidents should not be used as an excuse to condemn all raw milk. What is needed is a system in which farmers can produce milk that is intended to be sold as raw and monitored by the public health authorities in the same way other foods are monitored, to ensure reasonable standards of safety. The current double standard—that calls for unreasonably strict standards for raw milk and more lenient standards for other foods—is neither rational nor just. A balanced and objective approach would consider factors that are currently ignored, including the quality of milk from different sources and an honest appraisal of the health benefits of raw milk. An objective review would also recognize that deceptive articles in medical and public health journals have led physicians and officials to believe that all raw milk is dangerous. This misinformation, repeated to patients and the public via the media, has inculcated in most Americans an irrational fear of nature's perfect food.

Open and fair-minded officials need to learn that raw milk from healthy animals, carefully produced and handled, simply does not cause disease *and* has remarkable health benefits. True protection of the public health would involve officials working to help interested farmers to produce such milk, and physicians promoting the healthfulness of such milk to their patients and the public. This was exactly the situation in the early 1900s when the certified milk movement was in its heyday.

Since then, the public health and medical establishments have changed drastically. The authoritarian official American position that no one should have access to raw milk is a modern development—nearly every other country in the world allows those of its citizens interested in using raw milk a way to obtain it. The exceptions—Scotland, Canada, Ireland, New Zealand and

parts of Australia—have taken their lead from the American authorities.

While many people have a clear desire to secure high quality raw milk for themselves and their families, many more straddle the fence, much in need of accurate information. I've described some of the inaccuracies in the information coming from the compulsory pasteurization proponents who maintain that all raw milk is inherently dangerous. Unfortunately, some prominent advocates *for* raw milk have also been inaccurate in their declarations that raw milk never leads to acute illness. As is usually the case, the truth lies somewhere between the two extremes.

CHRONIC DISEASE, IMMUNOSUPPRESSIVE DRUGS AND RAW MILK

During the last twenty-five years or so, numerous reports associating raw milk consumption with outbreaks of acute gastrointestinal disease have appeared in the medical literature. Most of the cases involved *Salmonella* or *Campylobacter* bacteria. These reports make it clear that in susceptible individuals, illnesses are occasionally precipitated by pathogenic organisms sometimes found in raw milk of less-than-optimal quality.

A particularly virulent form of the bacterium *Salmonella* is *Salmonella dublin* (*S. dublin*). As with most infections, people with suppressed immune systems (for example, AIDS patients or people taking corticosteroids or chemotherapy) have the greatest risk. A report in the *Western Journal of Medicine* in May, 1983 was entitled "Invasive *Salmonella dublin* Infections Associated with Drinking Raw Milk."⁸ The author conducted a year-long study in 1980 and 1981 at the Veterans Administration Medical Center (VAMC) in San Diego. During that year, 14 cases of *Salmonella* infection had been diagnosed at the hospital; five of them were *S. dublin* infections. The ages of these five individuals ranged from 56 to 97, and all but one had a serious preexisting chronic disease or were taking immunosuppressive corticosteroid or chemotherapy drugs. Three of the five had drunk raw milk from Alta Dena dairy within the previous two weeks. This does not prove that the raw milk was the source of the infections, but it is a strong association.

One case was an 85-year-old woman with chronic leukemia, diagnosed in 1979. To quote from the article, "In September 1981 she was

treated for the first time with cyclophosphamide [a highly toxic chemotherapy agent which impairs natural immunity to infection] and prednisone three times a day. A week later diarrhea, fever and chills developed and she had a syncopal episode [temporary loss of consciousness due to a fall in blood pressure]. . . blood, urine, and stool cultures all grew *S. dublin*. . . she died on the 17th hospital day. . . This woman's immune status was compromised by both the leukemia and the therapy. She presented in shock with an overwhelming *Salmonella* bacteremia [bacteria in the blood].”

Three of the other four patients with *S. dublin* infections were sick enough to require antibiotic therapy and admission to the hospital; one was hospitalized for several weeks.

This brief story presents an excellent example of the gulf between practitioners of conventional medicine and those who advocate a holistic approach, and the patients who are so often caught in between. The three people who drank raw milk sought to help themselves to better health. The physicians involved in their conventional treatment and their colleagues blame the milk for subsequent illnesses and the one death. But advocates for raw milk, myself included, would argue that were it not for the immunosuppressive drugs, none of the individuals would have become infected with *Salmonella*. How long had the 85-year-old woman been drinking raw milk with impunity before her first week of chemotherapy, at the end of which she became deathly ill? The article does not address this question. About the many benefits of raw milk, the author says only, “I will not comment on the validity of the nutritional claims that are made for raw milk.” Furthermore, the doctors offered no proof that the raw milk the woman drank carried *Salmonella*.

In assessing relative risks, we also should keep in mind that the 1985 *Salmonella* multi-state epidemic in the Midwest that sickened nearly 200,000 people, hospitalized over 3,000, and killed 18 was traced to *pasteurized* milk. Pasteurized milk was also the vehicle in the Michigan PBB disaster described in Chapter 12, and numerous other incidents we'll look at later in this chapter.

Advocates for raw milk should recognize that *S. dublin* may be found in raw milk produced by herds that are harboring cows with mastitis or other infections. In all likelihood this occasionally results in acute illness,

particularly for people under treatment with immunosuppressive drugs. The greatest danger is from milk produced at conventional dairy farms that produce the vast majority of their milk for pasteurization but sell some raw to the public. Occasionally, however, milk from farms licensed to sell raw milk has been implicated in *S. dublin* infections. The milk in question in the cases described above came from Alta Dena Dairy in Southern California. The Alta Dena story will be told later in this chapter, but for now I'll simply note that there is very little pasture in Southern California and Alta Dena was not a pasture-based dairy. The amount of grass in the diet is known to be a critical factor in the health of the cows and the quality of the milk produced. When cows are strictly or mostly grass-fed, they pose little risk of *Salmonella* or any other infectious problem, even for individuals who are immunosuppressed. We know that Dr. Crewe at the Mayo Foundation used raw milk in the treatment of a wide variety of serious chronic diseases, and that he reported no problem, even with patients who were very ill. However, at that time the medical profession was not treating millions of people with immunosuppressive drugs. As a safeguard, I believe that individuals with compromised immunity should seek raw milk that is least likely to carry *Salmonella* or other pathogens. This means raw milk from animals fed mostly on green pasture.

TYPHOID FEVER, SCARLET FEVER AND DIPHTHERIA

When proponents of compulsory pasteurization speak of the dangers of raw milk today, it is often in reference to acute gastrointestinal illnesses that are usually short-lived and do not require medical treatment. This was decidedly not the case fifty or one hundred years ago, when raw milk was routinely blamed for a host of diseases often depicted as deadly. These diseases included typhoid fever, scarlet fever, diphtheria, tuberculosis and undulant fever. Although these diseases occur only rarely today—many have not been linked to milk at all since the 1950s—they are often trotted out in official publications, media stories and hearings on legislation affecting the sale of raw milk. Public health officials imply that should raw milk become more widely available, the old diseases would be back with us. An example is found in Elliot Ryser's chapter "Public Health Concerns" in *Applied Dairy Microbiology*:⁹

“Outbreaks of milk-borne illness date from the inception of the dairy industry. Bacterial infections including diphtheria, scarlet fever, tuberculosis and typhoid fever predominated before World War II and were almost invariably linked to consumption of raw milk. . . .” No reference is given for this incorrect information. Nor is there mention of the fact that pasteurized milk caused the worst milk-borne outbreak of scarlet fever ever; 4,755 people were stricken and 453 died during a four-month period in an epidemic that was traced to negligence at a local pasteurizing plant.¹⁰

Ryser continues: “. . . early surveillance efforts soon led to passage of the first Model Milk Ordinance, which stressed nationwide pasteurization and the eventual reduction in the incidence of milk-borne enteric diseases with no milk-borne cases of diphtheria, scarlet fever, tuberculosis, or typhoid fever reported in more than 40 years. . . . Banning the interstate shipment of all raw milk products, both certified and noncertified, in 1986 helped reduce the number of raw milk-related outbreaks. Sporadic illnesses continue to be reported, however, particularly among farm families who routinely consume milk from their own dairy herds.” Again no references are given, this time for the statement about farm families. Taken together, these passages are not only misleading but also very confusing. Let’s examine them and see why.

First we have the sentence “Bacterial infections including diphtheria, scarlet fever, tuberculosis and typhoid fever predominated before World War II and were almost invariably linked to consumption of raw milk.” Dr. Ryser appears to have told us that raw milk caused most of the cases of these illnesses. That would be blatantly untrue—but that is not quite what he is telling us. For if we check back to the sentence before (“Outbreaks of milk-borne illness date from the inception of the dairy industry”), we see that he may be referring only to cases of the diseases that were *milk-borne*.

But as indicated above, Ryser does not reference the “almost invariably” statement. How much milk-borne disease was actually attributed to raw milk in the years leading up to and during World War II? In her series of articles “Why Milk Pasteurization?” published in *The Rural New Yorker*, Jean Bullitt Darlington provided some revealing statistics published by the Ontario Department of Health and the US Public Health Service. For the

years 1934 through 1941, the total number of cases of typhoid fever reported for the province of Ontario, from all causes, was 1,995, with 245 deaths. The total number of cases reported as milk-borne was 16, with two deaths.¹¹ The records do not tell us how many of these few cases were associated with raw milk and how many with pasteurized. But it is clear that Ryser's association of typhoid fever and raw milk is highly misleading. In fact, less than one percent of the total cases of typhoid in the eight-year period were reported as milk-borne, and less than one percent of the deaths were from cases that were reported as milk-borne.

Figures for the United States demonstrate that Ryser's contention that milk-borne diseases "... were almost invariably linked to consumption of raw milk" not only has no basis in fact, but presents a picture that is the opposite of the facts. The US Public Health Service reported that in 22 years, 1922-44 inclusive, there was a total of 37,965 cases of all kinds of diseases traced to all varieties of milk and milk products, pasteurized and raw, with an average of 1,726 cases per year. For 1944 in particular, there were 1,449 milk-related cases, of which only 430 were attributed to raw milk. There were 20 deaths—only one of which was attributed to the consumption of raw milk.^{12,13}

As noted above, Ryser reports "... the eventual reduction in the incidence of milk-borne enteric diseases with no milk-borne cases of diphtheria, scarlet fever, tuberculosis, or typhoid fever reported in more than 40 years. . . . Banning the interstate shipment of all raw milk products, both certified and noncertified, in 1986 helped reduce the number of raw milk-related outbreaks." Here it appears that banning raw milk had the effect of reducing the incidence of diphtheria, scarlet fever, tuberculosis and typhoid fever. But since we have just been told that there have been no milk-borne cases during the last 40 years, Ryser is actually claiming a reduction in the "number of milk-related outbreaks" of "enteric diseases" (typically mild gastrointestinal illness). His next sentence is "Sporadic illnesses continue to be reported, however, particularly among farm families who routinely consume milk from their own dairy herds." The implication once again is that these sporadic illnesses include diphtheria, scarlet fever, tuberculosis and typhoid fever when in fact they are "enteric diseases"—a few days of diarrhea. Ryser provides no reference to document even this assertion. It is

impossible to say with certainty whether this writing is deliberately misleading or simply inept.

In earlier chapters, we've examined gross exaggerations by public health authorities of the extent of problems caused by raw milk—a constant theme through the medical literature of the past one hundred years. In Chapter 5, I described part of a 1929 address by William Dodge Frost, PhD and Doctor of Public Health, in which he analyzed the question of how many of the cases of typhoid, scarlet fever and diphtheria in the United States in the years 1906 through 1925 could be attributed to the consumption of milk. Here I quote some of the actual figures that formed the basis of Dr. Frost's conclusions:

“The table shows that the proportion of milk-borne typhoid to the total amount of typhoid varies from 0.17 to 0.94 of 1 percent and that the average for the 20-year period is about one-half of 1 percent (0.53 percent).

“In the case of scarlet fever, the yearly percentages range from 0.05 to 0.37 of 1 percent with an average of 0.106 percent.

“The percentages for diphtheria range from 0.0 to 0.18 of 1 percent, with an average of 0.028 percent.

“The milk-borne are 0.221 of 1 percent of the total [for all three diseases] or practically 1 case milk-borne to 450 cases acquired some other way.”¹⁴

This evidence about typhoid fever, scarlet fever and diphtheria should be considered along with that of Mrs. Darlington. Consider too that there have been *no* milk-borne cases of these diseases reported during the past 40 years, despite the continued legal availability of raw milk in some 35 states, and the fact that millions of farm families during the last 40 years have continued to drink raw milk. Is it not abundantly clear that any allusion to potential problems with these diseases today, should raw milk become more widely available, is a complete and utter smokescreen?

Once again quoting Mrs. Darlington, whose 1947 articles remain as relevant today as ever: “If evidence for the case for [compulsory] pasteurization is so difficult to find that it must needs be distorted and in some cases even invented—which is clear from the most recent publicity on the subject—an honest mind cannot fail to grasp that the case for [compulsory] pasteurization is a very weak case indeed.”¹⁵

TUBERCULOSIS

When milk pasteurization was introduced and then popularized as a solution to “the milk problem” around the turn of the century, tuberculosis was the scourge of the modernized world, a killer on a huge scale. While characteristic lesions of tuberculosis have been found in Egyptian mummies,¹⁶ and while the disease was described by Hippocrates in 400 BC,¹⁷ it was not until the rapid industrialization and attendant poverty of the 1800s that incidence exploded. People crowded into cities and, by choice or by chance, many ate poorly, a factor that undoubtedly contributed to susceptibility.

The victims were often young and gifted—Chopin, Keats, Stevenson, Chekhov, Orwell and the Bronte sisters—which lent a certain morbid romanticism to the disease. “The roll call of genius,” wrote Thomas Dormandy in *The White Death, A History of Tuberculosis*, “reads like an anthem for doomed youth.”¹⁸ Tuberculosis was “white” not because it was thought to be associated with milk, but because the pallor of anemia was an almost invariable clinical feature and because the disease had long been associated with childhood and innocence.¹⁹ Tuberculosis is not merely a disease of another era, for even today it takes over 1,500,000 lives each year worldwide, including some 1,800 in the United States. But milk-borne tuberculosis infections in developed countries have been virtually non-existent since about 1960. Proponents of compulsory pasteurization nevertheless often allude to tuberculosis as a threat to people who drink raw milk. The history of this perception, the perception that tuberculosis is caused by raw milk, reveals a great deal about how most people accepted pasteurization as a necessity, and condemned raw milk as a pariah.

The link of tuberculosis and milk in the public mind dates back to 1882 when Robert Koch announced his discovery of the tubercle bacillus as the cause of TB. In the same paper, he stated his famous four postulates that define how a particular infectious agent can be proven to be the cause of a particular disease. Hailed as the greatest scientist of his day, Koch announced a few years later that he had found exactly the same bacillus in the sores of tubercular cows and their milk. Meanwhile, Pasteur discovered that heat treatment of milk—later named pasteurization—would kill the tubercle bacilli and presumably save children from tuberculosis. These an-

nouncements were met with great excitement everywhere, for pasteurization promised to be the solution to the whole problem of tuberculosis. The promise was illusory, and the disease would not be controlled until the advent of antibiotics in the 1940s (and many still die of tuberculosis, in spite of the use of antibiotics). But significantly, in the years following Koch's and Pasteur's discoveries, great commercial possibilities opened up. Large sums of money were invested in the fledgling business of pasteurization—the foundation of the modern dairy industry.

In 1901, however, Dr. Koch announced that a prolonged series of experiments had proved that the human and the bovine tubercle bacilli were neither identical nor transmissible, and that humans had little to fear from the bovine bacillus. "The human subject is immune against infection with bovine bacilli," he wrote. "Human tuberculosis differs from bovine, and cannot be transmitted to cattle." This announcement too had great impact and although it sparked tremendous controversy, earned Koch the Nobel Prize four years later. But by then, pro-pasteurization proponents had taken action to refute Koch's findings. In 1904, a Royal Commission on Tuberculosis was established in England. The Commission declared that Koch was wrong, that tuberculosis in animals and in man was the same disease, and that the causative organisms are varieties of the same species. The Commission's wordings were vague, stated in terms like "it seems probable" and "it is not possible at present to say." Despite Koch's evidence to the contrary, the alleged spread of tuberculosis in milk to large numbers of children continued to be the major impetus behind the push for pasteurization.²⁰

Today, it is accepted that Koch was correct, that different types of tuberculosis are caused by several distinct species of the genus *Mycobacterium*, including human, bovine and avian.^{21,22} Human tuberculosis is spread primarily by inhalation, and may be spread in raw milk if a milk handler with tuberculosis coughs into the milk, or even by the milker's hands if the cow is milked by hand. Undoubtedly this played a role in the spread of the human strain of tuberculosis in the past, when tuberculosis was widespread. It was the advent of modern, closed-system milking machines, starting in the 1920s, and not pasteurization, that reduced the spread of the human strain of tuberculosis in milk to nearly zero.

Unlike human tuberculosis, bovine tuberculosis is extremely rare today—the disease has been almost completely eradicated through the testing of cows and the slaughter of those testing positive in herd certification programs that began in 1917. The history of those programs in both England and the United States sheds light on the still unresolved issue of whether and how much bovine tuberculosis has ever been spread to humans in milk. In a 1947 monograph (“Pasteurized Milk, A National Menace: A Plea for Cleanliness”), James C. Thomson described the situation in England: “We are told that cow’s milk in its raw state is the cause of bovine tuberculosis in children and that pasteurization acts as a preventative. If this were true, what is called bovine tuberculosis should be found in the villages where only raw milk is consumed, and there should be none in the towns where pasteurization is the rule. In point of fact the situation is exactly reversed. This is hard fact number one.”²³

Thomson then quotes Henry E. Armstrong in the September 19, 1919 *Journal of the Royal Society of Arts*: “It may be that the food value is so lowered [by pasteurization] that effects are produced which render the system specially sensitive to tuberculosis infection. Moreover, when milk is sterilized the lactic organism is destroyed, and it becomes a particularly favourable nidus for the putrefactive organisms, and is therefore a potent cause of infantile diarrhoea.” Thomson points out that while London by then (1943) consumed 90 percent of its milk pasteurized, the city had had great increases in both pulmonary and non-pulmonary tuberculosis. The latter was usually called bovine tuberculosis, historically attributed to the consumption of raw milk.

Thomson then tells about 4,000 farmers who went to the Iowa state capital to protest against the corruption that had arisen out of the compulsory tuberculin-testing of cows. The farmers believed that the test was useless and was being used to enrich the meat packers, who were buying up condemned cows cheaply. The farmers asserted that healthy cows often tested positive; the positive test merely indicated that these cows had immunity to tuberculosis. There was strong feeling that even in cattle that tested positive, the tubercle organisms were not passed directly into the cows’ milk.

That strong feeling was backed up by expert opinion. In 1933, Will-

iam Savage, cited by Dr. Ryser in *Applied Dairy Microbiology* as an authority on human and bovine tuberculosis,²⁴ published the following statement in the *British Medical Journal*:

“The cow which gives a positive reaction to the tuberculin test, but with no clinical signs of tuberculosis, usually is a valuable animal and a good milker. The reactors with no clinical signs are mostly in good health, giving normal milk, and as shown above, are not excreting tubercle bacilli or only very occasionally.”²⁵

Returning to the Iowa farmers, Thomson continued, “As a climax to their case, that year an Iowa farmer’s daughter, Marian E. Snydergaard, was chosen as the ‘Healthiest Girl in the United States.’ Out of a possible 100 her score was 99.7. Meantime it was ‘proved’ by the tuberculin test that all seven cows on the Snydergaard farm—whose milk Marion drank daily—were tubercular. As usual, however, the press and the radio proved their loyalty to the great vested interests. No national newspaper and no film or broadcasting company gave any publicity to the disturbing facts. Marian was main page news but no mention was made of the scandalous fact that she drank milk from tubercular cows. The AMA, the serum manufacturers and the packers won. With their control of the law, the newspapers, and the radio, they could not fail.”

Two separate questions about the possible relationship between tuberculosis in cows and tuberculosis in human beings present themselves. First, to what extent can the bovine tuberculosis bacilli pass directly into milk? Second, if transmitted in any way, can the bacilli cause tuberculosis in human beings? The answer to both questions appears to be, “Minimally, if at all.” Clearly the tubercle may be passed through a tubercular lesion on the udder, which occurs only when the disease in the animal has become generalized and obvious. The organism may also contaminate milk via manure from a tubercular cow with lung lesions (the cow swallows its mucous, infecting the feces with bacilli; the feces may then contaminate the milk through sloppy milking and handling). Contamination by these routes was undoubtedly common in the days of the distillery dairies, and would be expected to have occurred at times anywhere cows were kept in less-than-optimal conditions during the years when tuberculosis in cows was widespread.

In the authoritative textbook *The Market Milk Industry*, the authors describe these routes of contamination but make no mention of any direct route from the cow's blood into the milk.²⁶ Passage of the organism directly into the milk, in the absence of tubercular lesions on the udder, has never been proven. Yet many authors, including Ryser, state as fact that cows can shed *M. bovis* in their milk as a result of infections, and that the organism was commonly found in raw milk throughout the 1900s.²⁷ The accuracy of this and similar claims has been seriously challenged in recent years by scientists who question the ability of laboratories to reliably distinguish human from bovine bacilli.

Ironically, this information is provided in another of Ryser's references, a 1983 paper from the *Journal of Applied Bacteriology*, "A Review—the Bovine Tubercle Bacillus." Authors Collins and Grange write: "The search for a simple test to identify reliably a strain as *M. tuberculosis* [the human species] and preferably, to distinguish human from bovine variants has not been a fruitful one. . . no single method is entirely reliable." A description of the shortcomings of the various tests follows. Regarding these tests, widely used by the public health agencies, the authors state: "These tests have been used in the Public Health Laboratory Service tuberculosis laboratories [in Great Britain] for a number of years to identify *M. tuberculosis*. Unfortunately, they do not differentiate between the human and bovine variants. . . experience has indicated that no single test can be relied upon to make a clear distinction."

But the tests are unimportant anyway, Collins and Grange assure us. "The differentiation of *M. tuberculosis* into human and bovine strains is of no clinical value. . . when it could have been of epidemiological value the culture and identification of mycobacteria were confined to a few laboratories and were not regarded by physicians as being particularly useful in the diagnosis of tuberculosis."²⁸ The authors refer to the first half of the twentieth century, and we may assume that differentiation of the human and bovine strains was no more accurate then than it is today.

This and other sources make it clear that the diagnosis of bovine tuberculosis in human beings—and claims that many cases were of bovine origin—have never been more than guesswork. Data generated became propaganda for the proponents of compulsory pasteurization. As the center-

piece of over 80 years of vehemently anti-raw milk public health policy, we have a “scientific” argument based on laboratory “evidence” that the dairy industry’s own experts admit is unreliable and inaccurate.

TB FROM COWS

The preceding information allows for several reasonable conclusions:

- ♦ The spread of tuberculosis historically through raw milk is known with certainty to have occurred only when tuberculous milkers or handlers had contact with the milk.
- ♦ When grossly tuberculous cows with lesions on their udders were milked, or when the feces of cows with tubercular lungs contaminated the milk after milking, bovine tubercle organisms were found in milk. This may or may not have caused tuberculosis in humans; the evidence is conflicting.
- ♦ Animals that react to the tuberculin test are by no means necessarily diseased at all; and even if they are, it appears that the organism does not pass directly into the milk.

These conclusions, together with the fact that a positive test for tuberculosis in a dairy cow today is extremely rare, make it abundantly clear that the chances of contracting tuberculosis today from any raw milk, much less from that produced in a sanitary manner, approach zero.

Thus, scientific uncertainty and controversy about the possible relationship between bovine and human tuberculosis remain, particularly since the publication of the article cited above showing the inaccuracy of laboratory evidence. Despite this, Ryser asserts that “. . . in milk-borne cases involving *M. bovis*. . . prognosis was poor, with 2000 of 4000 childhood cases in Great Britain ending terminally in 1932. . . *M. bovis* infections were relatively common, with this organism accounting for 7% of all tuberculosis cases observed in New York City and 9% of all such cases reported worldwide. Reports circumstantially linking raw milk consumption to tuberculosis also abound in the early literature.”²⁹

But now, after this diatribe against raw milk, with his very next sentence Ryser reveals his entire argument as a smokescreen, a figurative house

of cards. “However,” he writes, “only three reports are supported by strong bacteriological evidence. In the first of these outbreaks, *M. bovis* was recovered from raw milk consumed by 3 of 45 Canadian children in whom nonpulmonary tuberculosis developed.” This was in 1934. So, we have three reports in the past 80 years, and in the first, a laboratory test (which we now know cannot reliably distinguish between the bovine and the human tuberculosis bacillus) indicated the bovine organism was present in 3 of 45 raw milk-drinking children with tuberculosis. This is what Ryser calls “strong bacteriological evidence.”

“The second outbreak,” Ryser continues, “occurred in 1936 and was traced to a small Swedish village. Milk from a cow with active tuberculosis of the udder was reportedly consumed raw. . . tuberculosis developed even though the local dairy farm had a rigorous tuberculosis screening program in place at the time of the outbreak.” Ryser’s reference is an editorial in *The American Journal of Public Health*, from which we learn that *all* of the townspeople drank raw milk from the dairy (except those who had their own cows). Yet a total of only 56 people were reported to be “infected.” We are not told how many showed symptoms and how many were symptom-free positive reactors. Most strikingly, we also learn that “There is no statement that tubercle bacilli were isolated. . . and proved to be bovine.”³⁰ The cow with a tuberculous udder was found to be shedding tubercle bacilli into her milk; this is apparently Ryser’s “strong bacteriological evidence” for this case. Note the implication that even “a rigorous tuberculosis screening program” is no protection against the scourge of raw milk today.

Ryser’s third “outbreak” is a single case. “A young boy living on a Michigan farm reacted positively to a tuberculin skin test after ingesting raw milk from his parents’ herd of 34 dairy cows, several animals of which were heavily infected.”³¹ That’s all Ryser has to say about this “outbreak,” his final report of “strong bacteriological evidence” linking raw milk consumption to tuberculosis. His reference is a report by Michigan veterinarians, from which we learn that a cow sent to slaughter was found to have tuberculosis by a meat inspector. Tests on the herd of 182 animals (not 34 as Ryser stated) found 181 had positive reactions. Several were found at slaughter to have extensive disease.

The veterinarians’ article also stated that “Seven family members all

drank raw milk from the herd. Chest X-rays on all 7 family members were normal; skin tests revealed 1 positive reactor.³² This was the young boy to whom Ryser refers, who was in good health and had a complete lack of symptoms. Although it is not at all clear why, the entire family was nonetheless placed on anti-tuberculous drugs.

This family actually offers “strong bacterial evidence” that the bovine tubercle does *not* cause tuberculosis in humans. To find that one family member in seven is a healthy tuberculosis reactor is not unusual; the boy could have been exposed to tuberculosis in any number of ways and developed immunity. The other six family members were not reactive, indicating no exposure to tuberculosis despite drinking raw milk from a herd in which 181 of 182 animals tested positive for bovine tuberculosis and of whom several had “extensive disease.”

The fact that there have been *no* cases of tuberculosis even linked to milk during the last forty years, and that no substantial evidence proves an association between bovine and human tuberculosis, does not stem the tide of polemics about raw milk and tuberculosis. A few examples:

- ♦ Bovine tuberculosis “. . . could be transmitted through the milk of diseased cattle.” The implication is that all cattle that test positive are diseased. This is followed by a graphic description of the horrors of tuberculosis, complete with an 1880s photograph of children in a New York City sanitarium. This is in *Milk, the Fight for Purity*, a book designed for school libraries.³³
- ♦ “*Mycobacterium bovis*, which usually infects cows, causes bovine tuberculosis in people. Humans usually get it by drinking unpasteurized milk from infected cows.”³⁴ Again the implication is that any cow testing positive is “infected.” The quote is from a microbiology textbook for college students.
- ♦ “Cows that were infecting the milk supply could now [through tuberculin testing] be eliminated before they transmitted the disease to countless millions of people.”³⁵ This is from *The Dairy Industry in America*, an industry version of dairy history designed for libraries.

Misinformation serves a purpose; the public becomes conditioned to accept half-truths and deceptions. Public health authorities still regularly raise the spectre of tuberculosis in their campaign against raw milk, in books, articles, statements to the media and legislative hearings about raw milk.

TB AND HERD DEPOPULATION

William Campbell Douglass, an iconoclastic medical doctor, provides us with a final story about tuberculosis in *The Milk Book*.³⁶ Douglass, a long-time and vocal advocate for raw milk, relates that in South Carolina in 1982, state Senator T. Ed Harrison, a dairy farmer and chairman of the Agriculture Committee, introduced a measure before the state legislature to allow commercial sales of raw milk in the state. Cows producing such milk and the milk itself were to be inspected and tested on a regular basis.

An editorial in *The Columbia Record* (April 27, 1982) reports on the legislative debate about the measure. C. E. Boyd, the state veterinarian, “. . . told the story of a herd of 385 dairy cows that had to be ‘depopulated’ when more than half were found to be tuberculosis reactors. Milk from those sickly cows was pasteurized before it went to market. ‘I can’t predict what would have happened if that milk had been sold raw,’” Boyd is quoted as saying. The editorial then urges defeat of the measure.³⁷

Douglass writes, “Boyd knew perfectly well that a positive skin test for tuberculosis, a ‘tuberculosis reactor,’ did not mean the animal had tuberculosis. Ninety-nine percent of the time it means that the animal (or person) is immune to tuberculosis. I testified that half of the hundred people in the hearing room undoubtedly had positive skin tests for tuberculosis, but that did not mean they had to be treated. Even if the cows had TB, I said, the milk would still be okay to drink. I pointed out that tuberculous people, not cows or cows’ milk, give tuberculosis to people.”³⁸

Boyd also knew that any cows producing commercial raw milk would be regularly tested for tuberculosis. And we may assume that as a veterinarian he knew that tuberculosis organisms, whether bovine or human, find their way into milk only if the cattle are diseased or the milk is grossly mishandled. Douglass’ story again demonstrates the distortions and deceptions to which officials and writers resort in their efforts to discredit raw milk and block legislation that would allow the public a choice.

RAW MILK PROTECTS AGAINST TB

A few historical points make it clear that raw milk can be consistently produced in a manner that completely eliminates any danger of tuberculosis. Recall our discussion of Weston Price's studies of the Swiss people of the Loetschental Valley in 1931. Tuberculosis at that time took more lives in Switzerland than any other disease. Yet Swiss government officials reported to Price that a recent inspection of the valley had not revealed one single case. Astonishingly, Price's thorough study of records of death certificates revealed that no deaths had occurred from tuberculosis in the history of the valley.³⁹ The chief source of calories among the Swiss of the Loetschental Valley was raw milk.

Several other traditional cultures that used raw milk as the principal food were discussed in Chapter 8. In none was there any evidence of tuberculosis. Recall also that Francis Pottenger made extensive use of raw milk in his therapies for chronic diseases, including tuberculosis, and that Dr. Crewe's milk cure at the Mayo Foundation during the 1920s proved efficacious in treating the disease. As often seems to be the case, the truth here lies at the opposite extreme of what the "experts" would have us believe. Since before the dawn of recorded history, raw milk has been one of mankind's chief protectors from the ravages of tuberculosis and other dreaded diseases.

BRUCELLOSIS OR UNDULANT FEVER

Although fewer than 200 cases of human brucellosis occur annually in the United States, this disease is still considered the most important illness to afflict both animals and humans. The vast majority of cases occur in meat-packers, veterinarians and farmers because the causative bacteria, *Brucella* species found in infected cattle, sheep, goats and pigs, can be acquired through contact with the animals through even a minute break in the skin. The symptoms can be severe, including relapsing fevers (thus the alternate name undulant fever), weakness, malaise, pain and loss of appetite, but with few physical abnormalities. There are occasional deaths.

Brucellosis has been almost completely eliminated from cows through testing and herd eradication programs begun in the 1930s. Most cases in this country today are caused by *B. suis*, which occurs in pigs. But outside

the United States, brucellosis is considered endemic, especially in northern Mexico and in many South American, Latin American, Mediterranean, Middle Eastern and African countries.⁴⁰

Brucellosis in cows can cause abortion, and the organisms can persist in the udders of cows for years following an abortion. The organisms are intermittently shed into milk in significant numbers.⁴¹ Outbreaks have indeed been associated with raw milk. In January and February of 1946, 28 cases of human brucellosis were reported in a small town in eastern Maryland. *Brucella* organisms were isolated in the Maryland State Health Laboratory from two human cases. The other human cases had positive blood tests and clinical symptoms of the disease, but there were no deaths. The outbreak was attributed to infected milk from an uninspected source that was distributed during the Christmas holidays by a local raw-milk dealer when there was a shortage of milk. One of the dairymen supplying the milk had 14 cows of which 7 reacted positively to the test for brucellosis.⁴²

Another milk-associated outbreak in 1934 apparently resulted from porcine infections in dairy cattle on an Iowa farm where cattle had been allowed to intermingle with hogs—not good farming practice. *B. suis* is the most virulent of the *Brucella* bacteria. Twenty-seven cases occurred among 350 regular patrons of a raw milk dairy over a period of three months. But again, there were no deaths.⁴³

One wonders about the 323 regular patrons of the dairy who did not become ill. In the 1940s, when brucellosis in both cattle and humans was much more commonplace, Francis Pottenger studied some 1800 cases. “The suspected and reported sources of the *Brucella* infections were numerous,” he wrote. “However, less than three percent could be attributed to milk as the possible source. Very significant was the observation that almost every patient’s previous dietary habits indicated possible malnutrition long before symptoms of brucellosis or other conditions inviting the physician’s attention had ever appeared.”⁴⁴

Pottenger’s co-author was William A. Albrecht, PhD, the preeminent soil scientist of the era and the author of many classic books on the relationship between soil and health. Pottenger and Albrecht concluded that trace mineral deficiencies in the soil and inadequate nutrition were the underlying cause of brucellosis in both cattle and man. With proper nutrition, both were

immune to *Brucella* infections.

Brucellosis remains of concern today not only because of the occupational workers who contract the disease, but also because of occasional cheese-related outbreaks in the US and foreign countries. Consumption of Mexican-produced raw goat's milk soft cheeses was implicated in outbreaks in El Paso, Texas, in 1968, 1973 and 1983. In 1994, 69 percent of the brucellosis cases reported nationally occurred in Mexican border-states, namely Texas, Arizona and California, presumably linked to eating illegally imported raw milk Mexican cheeses. In England, 28 cases were reported as acquired abroad between 1992 and 1995 during visits to various Mediterranean, Middle Eastern and North African countries, with the presumption that many of these cases were milk-borne or cheese-borne.⁴⁵ Travelers to these regions would be wise to use discretion and choose raw milk products made only by producers with outstanding local reputations for top quality.

Although brucellosis has been virtually eliminated from dairy cattle in the United States, the threat is still used to keep unaged soft raw milk cheeses out of the country. As a result, some of the tastiest and healthiest cheeses in the world are unavailable here, for the same reasons that raw milk is generally unavailable or difficult to find. But as we strive to change regulations that have restricted the freedom to choose raw milk and its products, we must recognize that if not produced with proper care, they can occasionally lead to acute illness.

This is particularly relevant in our discussion about brucellosis because advocates for raw milk have made misstatements about this disease. Douglass states flatly in *The Milk Book* that raw milk cannot transmit undulant fever, that cows cannot transmit the pig strain of undulant fever in their milk, and that undulant fever cannot be transmitted in cheese. He and co-author Aajonus Vonderplanitz repeat these errors and make several others in "The Supplemental Report," an otherwise admirable document prepared during the successful 2001 campaign spearheaded by Vonderplanitz to reintroduce raw milk into Los Angeles County (to be more fully discussed in Chapter 16):

"Brucellosis is not contracted through milk," the Report reads, "but by association directly with animals. The farmer or other adult milking the

cow would often get brucellosis, but his children, who drank most of the milk, seldom got the disease. It should be noted that even raw milk produced under gross conditions has rarely been proved to be associated with cause of an epidemic. All proved food-related outbreaks in the public have been caused by processed and restaurant food.”⁴⁶ These statements want to have it both ways. We are told that brucellosis is not contracted through milk, and the children “seldom” got the disease. But “seldom” is not “never.” Raw milk has “rarely” been proven to be associated with an epidemic. But “rarely” is not “never.” In other places, the report claims that raw milk has never caused brucellosis or any other disease, and numerous other claims are made in support of this notion.

Disease caused by raw milk is indeed rare, as is brucellosis caused by raw-milk cheese. The intense and biased focus of the public health authorities on these problems, which constitute a miniscule fraction of the food contamination problems in the United States, is in my opinion a disgrace and represents a failure of our institutions. But let’s not abandon reason and the search for truth. Advocates for raw milk need to recognize, whether discussing brucellosis or scarlet fever, *Salmonella* or tuberculosis, that even the healthiest food, when mishandled, can cause disease.

A STORY FROM NEW HAMPSHIRE

We conclude our section on brucellosis with an old story recounted by the same Mr. Vonderplanitz. The story originates with a New Hampshire man who gave up dairy farming in the mid-1950s.

“It took being driven out of farming to have enough time to recognize what had been done to us,” the man told Vonderplanitz. “You put the final pieces of the puzzle together when you published a short reference about brucellosis being a deficiency disease. If it is, then the programs to control it are nothing more than a political football.

“When I was a boy my father and I went to see an old man who sold me his single shot 22. On the way home my father told me the story behind the man; I was young enough to not understand the implications, but old enough to remember.

“The gentleman had been a long time New England sales rep for many ag equipment manufacturers. Knew the territory and politics inside out. In

retirement he had a small farm almost within the 'city limits' of a nearby town. Had eight milkers and sold his milk retail personally. Lo and behold, the State of New Hampshire pioneered a brucellosis eradication program in the early thirties. This gentleman's herd had three reactors and four suspects, which meant he couldn't sell the milk unless they were removed from the herd via a slaughter program. He kept selling milk.

"Pretty soon the State gave him a cease-and-desist order. He continued to sell milk, and was taken to court, where he asked the judge in an offhanded manner if he was allowed to have anyone testify on his behalf. The judge asked how much time was involved. 'Probably have them here tomorrow,' the farmer said. Permission granted.

"Four veterinarians, from Maine, Vermont, Massachusetts and Canada, showed up the next day. All testified that they had drawn blood on the herd recently and all were negative. Case closed, and the old gent sold milk until he died without further molestation.

"What the old gentleman probably knew, but was discreet enough to not speak out loud, was the fact that the Hood Dairy Company was trying to expand its control of fluid milk to include the 'Boston Milk Shed,' which included most of New England north of Boston. With thousands upon thousands of little farmers with four to ten cows supplying the local milk demands, Hood couldn't muscle into control. But if the little fellow was 'legally' forced to replace part of his herd overnight, he would have to close up business. That is exactly what happened. These little farmers couldn't afford to replace the brucellosis reactors and suspects that the state identified, on a short notice. This was the first step to 'big farming' in New England. Supposedly the cattle slaughtered were sent to a state-approved slaughterhouse where the carcasses were carefully examined and suspected portions were removed from human consumption.

"Many a moon later, when in the Navy on the other side of the world, I talked with a sailor from New Hampshire. . . . I discovered that he had worked in the only state-approved slaughterhouse for brucellosis-contaminated cattle. How were the supposedly contaminated parts eliminated? No different than in any other slaughterhouse he worked in—everything went into human consumption. So much for the protection of the consumer and the rape of the farmer.

“Long after my Navy days, I heard on the radio in the 1980s that whole herds were to be shot and buried in central Vermont because of an outbreak of brucellosis. I could hardly believe my ears. So, I called the local radio station and asked to talk with the news announcer. He was a good PR person and easy to talk to. I gave him a brief run-down on what I’ve told you. He assured me that it was a serious threat because he had been there and saw the cattle shot and buried. I explained the politics of the ‘show.’ He was surprised, and said he would look into it further.

“I went to the station a week later to talk personally with him. I was informed that he no longer worked for the station. Hmm. Strange that he got a sampling of the truth, and within a week is no longer employed. Whenever brucellosis rears its ugly head, hunt for who’s to benefit. The milk wholesale buyer? The beef processor? The farmers affected are classified ‘outlaws.’ Is somebody peddling the truth and needs to be silenced? Or a dozen variants.”⁴⁷

CURRENT PUBLIC HEALTH CONCERNS AND E. COLI O157:H7

A brief discussion of the full scope of food-borne illness in the United States today provides a useful prelude to consideration of incidents involving both raw and pasteurized milk. Nearly all incidents involving raw milk have involved mild symptoms in at most a few dozen people. If all of the reports are accurate, and raw milk were indeed the immediate cause of all of the incidents to which it stands accused, then over the past 25 years or so, a few hundred people have become ill for a few days. A few dozen may have been seriously ill, and a few with serious underlying medical problems may have died.

In contrast, some 200,000 people are sickened each day in the United States due to food-borne illness; about 900 are hospitalized, and about 14 die. The Centers for Disease Control (CDC) states that over a quarter of all Americans come down with food poisoning each year. Only a fraction of these cases are ever reported. Studies have shown that many food-borne pathogens can trigger serious chronic diseases, including autoimmune disorders, heart disease, neurological problems, kidney damage and inflammatory bowel disease.⁴⁸

Small social gatherings used to be the source of most cases of food

poisoning. Such outbreaks still do occur, but new kinds of outbreaks are more typical now, outbreaks caused by changes in the way food is produced. According to Dr. Robert V. Tauxe, head of the Foodborne and Diarrheal Diseases Branch at the CDC, America's centralized, industrialized system of food processing has created outbreaks that have the potential to sicken millions of people.⁴⁹

Food-borne illness from milk products usually involves gastrointestinal illness precipitated by the bacteria *Salmonella* and *Campylobacter*. Incidents involving these two organisms have accounted for most dairy-related illnesses reported since the early 1980s. Recently, the new virulent form of *E. coli* (*E. coli* O157:H7) has caused dairy-related outbreaks of illness, which have received considerable attention because of the particularly severe or fatal complications sometimes produced by the organisms. In *Applied Dairy Microbiology*, Ryser reports, "at least 60 cases of raw milk-associated illness" due to *E. coli* O157:H7. In the same paragraph, he documents more than 500 hamburger-related cases of *E. coli* O157:H7 illness that caused the deaths of four children in 1993. At least 15 additional outbreaks linked to the consumption of undercooked ground beef occurred in the 1980s. In Canada, 1600 cases were reported in 1992, and 1400 were reported in the United States in 1994.⁵⁰

In the cases "associated" with the consumption of raw milk, *E. coli* O157:H7 has been found in the feces of a few of the cattle in the involved herds, but not in the milk. On the other hand, a recent paper reported that *E. coli* O157:H7 is in 10 percent of raw milk bulk tank samples collected from 69 different Wisconsin farms.⁵¹ Apparently this pathogen can find its way into raw milk by fecal contamination, and clearly it can lead to serious illness. A reasonable assumption is that it is not found in healthy animals fed on green grass or hay.

Ryser also documents a number of *E. coli* O157:H7 outbreaks that involved pasteurized milk, citing faulty pasteurization or post-pasteurization contamination. As usual, Ryser cites these outbreaks as additional reason for compulsory pasteurization. Writing of one outbreak involving 18 severe cases in Montana in 1994, however, he actually provides us with fair warning that one should avoid all *pasteurized* dairy products (though this was certainly not his intent):

“This outbreak does raise serious new public health concerns regarding the possible presence of toxic strains of *E. coli* in factory environments and their entry into finished products as post-processing contaminants.”⁵² It appears that what’s in the milk is the same thing Eric Schlosser told us is in the meat.

E.COLI IN OTHER FOODS

While *E. coli* 0157:H7 may pose a threat to individuals who consume raw milk from conventionally managed herds, it poses no threat to consumers of raw milk from healthy, grass-fed. But virulent *E. coli* in other foods, such as undercooked meat, is a prime candidate to cause the type of epidemics that Dr. Tauxe of the CDC is most concerned about—those that sicken millions of people.

The organism was first identified in 1982. This pathogen has become widely dispersed in the food supply with the rise of huge feedlots, slaughterhouses and hamburger grinders. Meat production in America is ever more centralized: most of the beef consumed in the United States is now slaughtered in thirteen large packinghouses. Eric Schlosser, author of *Fast Food Nation*, provides the following description:

“The meat-packing system that arose to supply the nation’s fast food chains—an industry molded to serve their needs, to provide massive amounts of uniform ground beef so that all of McDonald’s hamburgers would taste the same—has proved to be an extremely efficient system for spreading disease.

“The large meatpacking companies have managed to avoid the sort of liability routinely imposed on the manufacturers of most consumer products. Today the government can demand the nationwide recall of defective sneakers, but it cannot order a meatpacking company to remove contaminated, potentially lethal ground beef from fast food kitchens and supermarket shelves.”

Schlosser is blunt in his attribution of blame. “The unusual power of the large meatpacking firms has been sustained by their close ties and sizable donations to Republican members of Congress. It has also been made possible by a widespread lack of awareness about how many Americans suffer from food poisoning every year and how these illnesses actually

spread.⁵³ Not just in the US, but throughout Western Europe, people are beginning to question the massive, homogenizing systems that produce, distribute and market their food.⁵⁴ It is a sad but undeniable fact that for the past two decades the right wing of the Republican Party has worked closely with the fast food industry and the meatpacking industry to oppose food safety laws, worker safety laws and increases in the minimum wage.”⁵⁵

Furthermore, the public health establishment is unwilling or unable to take meaningful steps to enforce decent standards for the products of industrialized agriculture. Instead, public officials spend considerable time, energy and public money campaigning for nationwide compulsory pasteurization of virtually every drop of milk in the United States. We turn now to the story of just how far these officials were willing to go in pursuit of their agenda in the state of California.

SALMONELLA AND ALTA DENA DAIRY

Infection with *Salmonella* species accounts for a substantial portion of food-borne illness in this country, with an estimated million and a half cases and 500 deaths annually.⁵⁶ An infective dose of *Salmonella* requires at least a million organisms. Ground beef is a common and persistent source; USDA regulations allow for up to ten percent of the samples taken at a given plant to contain *Salmonella*, but these limits are often exceeded. High levels of *Salmonella* in ground beef indicate high levels of fecal contamination. Meanwhile, known sources of *Salmonella* are fed to cattle. Quoting again from *Fast Food Nation*:

“A study published a few years ago in *Preventive Medicine* notes that in Arkansas alone, about 3 million pounds of chicken manure were fed to cattle in 1994. According to Dr. Neal D. Barnard, who heads the Physicians Committee for Responsible Medicine, chicken manure may contain dangerous bacteria such as *Salmonella* and *Campylobacter*, parasites such as tapeworms and *Giardia lamblia*, antibiotic residues, arsenic and heavy metals.”⁵⁷

An example of the difficulty USDA officials have in enforcing regulations against the meatpacking industry is provided by the 1999 case of a ground beef plant in Dallas, owned by Supreme Beef Processors, which failed a series of USDA tests for *Salmonella*. Up to 47 percent of the

company's ground beef contained *Salmonella*—nearly five times higher than that which USDA regulations allow. Yet the USDA continued to purchase large quantities of meat from Supreme Beef for use in schools. Indeed, Supreme Beef Processors was one of the nation's largest suppliers to the school meals program, annually providing nearly half of its ground beef. On November 30, 1999, the USDA finally removed inspectors from the company's plant, shutting it down.

The next day, Supreme Beef sued the USDA in federal court, claiming that *Salmonella* was a natural organism, not an adulterant, and contending that the USDA should not have removed inspectors from the plant. Federal Judge A. Joe Fish ordered inspectors back into the plant, pending resolution of the lawsuit. The plant shutdown lasted less than one day. Six months later the judge issued a decision, “. . . ruling that the presence of high levels of *Salmonella* in the plant's ground beef was not proof that conditions there were ‘unsanitary.’ Fish endorsed one of Supreme Beef's central arguments: a ground beef processor should not be held responsible for the bacterial levels of meat that could easily have been tainted with *Salmonella* at a slaughterhouse. The ruling cast doubt on the USDA's ability to withdraw inspectors from a plant [and thus shut the plant down] where tests revealed excessive levels of fecal contamination. Although Supreme Beef portrayed itself as an innocent victim of forces beyond its control, much of the beef used at the plant had come from its own slaughterhouse in Ladonia, Texas. That slaughterhouse had repeatedly failed USDA tests for *Salmonella*.”⁵⁸

In contrast, consider the story of raw milk and *Salmonella* in California. The California State Health Department and several county health departments, most notably those of Los Angeles and San Diego counties, conspired for some 30 years to harass the Alta Dena Dairy, and nearly every other raw milk dairy in the state, and put them out of business.

The Steuve brothers—Ed, Harold, and Elmer—founded Alta Dena in Monrovia in 1945 with 61 milk cows and two bulls. Dr. Pottenger was a regular customer. In 1950 the family purchased a much larger operation in Chino. The dairy became certified for raw milk production in 1953 and grew rapidly. By the 1980s, the dairy milked over 8,000 cows daily and owned 18,000 animals. With 800 employees, Alta Dena was the largest producer-distributor in the nation, selling over 20,000 gallons of certified

raw milk daily. Alta Dena products, including raw milk and raw butter, buttermilk, ice cream, kefir and yogurt were sold in health food stores in every state. For over 40 years, Alta Dena proved that safe and healthy raw dairy products could be produced and distributed on a large scale with literally *no* proven cases caused by their products. This did not deter the various county health officials and the California State Health Department from their campaign to destroy Alta Dena. Eventually, the Department's chosen weapon would be *Salmonella*, a weapon they used only after failing with the alleged threat of a number of other diseases to generate fear of raw milk in the public and a costly ongoing legal morass for Alta Dena.

The first assault occurred in 1965, when a San Diego County health officer named Askew summarily issued an order banning all raw milk in the county, claiming to have found *Staphylococcus aureus* in Alta Dena milk. While these bacteria can be involved in everything from skin infections to pneumonia, they are ubiquitous in the environment and are carried by about half of the human population. Many pasteurized dairy products contain low levels of *S. aureus*, the residues of higher levels present before pasteurization.⁵⁹ *Staph* poisoning is usually traced to processed foods such as ham and cream-filled pastries. Although *Staph* can cause mastitis in cows and staphylococcal poisoning has on occasion been attributed to a wide variety of dairy products in the past, the only four major outbreaks reported in the United States since 1970 have involved either processed butter products or pasteurized 2% chocolate milk.⁶⁰

Illness caused by *Staph* is brief and intense, with nausea, vomiting, diarrhea and cramps. Acute symptoms last only a few hours, with the patient fully recovered within a day or two.⁶¹ No one had become ill when Alta Dena milk was banned in San Diego County. "The health officer stated publicly that he was going to do away with raw milk in the state of California," writes Douglass in *The Milk Book*, "if it was the last thing he ever did."⁶²

According to Douglass, health officer Askew was asked, at a hearing of the County Board of Supervisors, whether to his knowledge anyone had ever become sick from drinking certified raw milk in San Diego County. He answered, "No, but it could happen." The Board urged that he lift the ban, yet he refused to do so. The country's largest producer-distributor dairy

could not sell its raw milk in San Diego County, and the ban remained in effect for three years.

Finally, after a three-year battle, the 4th District Court of Appeals ruled that the health officer had exceeded his authority. Meanwhile, in 1967, the California Medical Society had passed a resolution calling for the pasteurization of all milk in California. Three other counties summarily banned raw milk, but vociferous public opposition succeeded in removal of the bans.

It was in January of 1969 that the Los Angeles County Health Department attacked Alta Dena. *The Los Angeles Times* announced, with banner headlines based on information supplied by the Health Department, that Alta Dena raw milk was banned with the presumption of contamination by the organisms that cause Q fever. This obscure viral-like disease is caused by the parasite *Coxiella burnetti*, which is carried in ticks and sometimes in the ruminant animals that ticks infect. The parasite causes no symptoms in the animals; most cases of Q fever occur in farmers and meat factory employees who work in close contact with animals, and the disease appears to be transmitted by inhalation of the parasite. The symptoms are fever, pain and intense headache, and most patients recover fully with two to four weeks of antibiotic treatment.⁶³

C. burnetti has been found in milk from cows carrying the parasite, and regular consumers of raw milk sometimes have antibodies to the parasite without showing any evidence of disease. This implies that exposure stimulates the immune system to develop resistance. Two reports in the medical literature have linked raw milk consumption with a few dozen cases of Q fever (one article was published in 1968, a few months before the Los Angeles County charges), but the association remains totally unproven. In fact, Ryser states that “. . . in one study in which contaminated raw milk was ingested by human volunteers illness did not occur.” Other studies showed that the parasite survived the temperatures normally used for pasteurization for most of the twentieth century.⁶⁴ On balance, it appears unlikely that Q fever has ever been transmitted by the consumption of raw milk.

No one in Los Angeles County had reported any symptoms of Q fever. Alta Dena defied the LA County Health Board ban, continuing to sell

raw milk in the county, and was taken to court. Meanwhile the dairy labeled its raw milk as “pet food, not for human consumption.” Harold Steuve, president of the dairy and the mayor of Monrovia at the time, was arrested for contempt of court. Only when Alta Dena expert witnesses testified that Q fever was caused by inhalation of the parasite and not by consumption of raw milk did prosecutors drop the charges.

A 1966 Los Angeles County Health Department report on Q fever proves the health department’s bias. The report describes seven cases, six of which lived “in or around dairies.” None of the seven drank raw milk. Contact with animals and subsequent airborne spread, the report admitted, was the vector for infection, but claimed that “the most practical solution now available” was the universal pasteurization of all milk.

The California State Health Department led the next attack in 1974 with a statewide ban of Alta Dena’s raw milk, citing the threat of brucellosis. All Alta Dena cows had of course been vaccinated against the disease and were routinely tested as an extra precaution. The ban forced the dairy to go to court once again and to retest the entire herd. No brucellosis was found, and Alta Dena resumed sales of raw milk. But, once again, the Stueves lost thousands of dollars in lawyers’ fees and testing expenses and an untold amount of lost sales due to adverse publicity.

Having failed to show that Alta Dena raw milk had ever caused any of the classic milk-borne illnesses, the state zeroed in on *Salmonella*. In the mid-1970s the state made numerous claims that *Salmonella* contaminated raw milk produced by Alta Dena and other California raw milk dairies. In 1978, the Steuve brothers led California raw milk producers in seeking a California state Senate bill requiring the State Health Department to oversee raw dairy foods in a manner similar to that of other food products. On June 4th, a week before the Senate bill was to come up for debate, a state laboratory claimed to have found *Salmonella* in Alta Dena milk.

The State Health Department delayed five days in releasing the information, while the public bought and consumed the milk—milk the state would subsequently declare was a public health hazard. Then on June 9th, two days before the Senate debate was to begin, the Department notified the press of the alleged contamination, claiming that an epidemic of *Salmonella* poisoning was imminent.

The only epidemic was an outbreak of inflammatory news reports. From San Rafael to Sacramento, from Ventura to Vallejo, raw milk producers stood accused: “Raw Milk Warning,” “Some Raw Milk Found to be Contaminated,” “Contaminated Raw Milk Ordered Off Shelves.” Radio announcements warned the public not to drink raw milk from Alta Dena dairy. No one got sick, but in the hysteria the Senate bill failed.

A few days later, after reviewing relevant documents, the *Los Angeles Herald Examiner* accused California State Health Department officials of falsifying bacterial reports in order to defeat the Senate bill. Two independent laboratories—one that did testing for the Los Angeles County Medical Milk Commission, and the other that did considerable testing for the state—returned negative results for *Salmonella*. The Health Department laboratory had either falsified its results, or the testing methods had been so sloppy that the milk samples were contaminated during the testing procedures. The *Herald Examiner* article hinted at a conspiracy among members of the State Health Department to eliminate raw dairy products.

Other State Health Department tactics bolstered the conspiracy charge. In several instances, products for which there was no evidence of contamination at all—falsified, inaccurate, or otherwise—were destroyed. Officials forced a food store manager to pour 90 gallons of certified raw milk down a toilet. Health officers punched holes in Alta Dena raw cheese, and poured Chlorox over it. The Department leaked a “staff report” to *New Age*, a widely read California magazine, which published excerpts in August 1978. “Evidence points to a continuing health hazard to the public consuming Alta Dena’s raw certified milk,” reported *New Age*, and quoted a medical epidemiologist who claimed that Alta Dena raw milk was killing cancer patients.

The epidemiologist and two of his colleagues, both of whom worked with the California State Health Department, published a report in the *British Medical Journal* stating that 22 patients, mostly with leukemias and lymphomas, had died between 1971 and 1975, sometime after being “exposed” to Alta Dena raw milk. Publication in a foreign journal made the authors relatively immune to lawsuits. Since then, the article has been widely quoted as scientific fact in American journals.

The governor’s office in California received over 17,000 letters, telegrams and phone calls in defense of Alta Dena within two months of the

Herald Examiner report. The furor died down, but the number of letters alone grew to over 50,000. The State Health Department was undeterred, repeating unconfirmed allegations of *Salmonella* contamination later in 1978 and again in 1979. Both times, newspapers generated the usual scare headlines: "Poisoned Milk Recalled," "State Issues Warning About Alta Dena Milk," "Tainted Milk Ordered Off Market Shelves." Again the allegations were false, no one got sick and Alta Dena carried on. But one by one, other raw milk producers in the state went out of business.

In 1983, Nevada state inspectors seized Alta Dena raw milk from a health food store and claimed it contained *Salmonella*. The milk was 21 days old, past its expiration date. Four different labs, including the California State Health Department lab and one county lab, subsequently analyzed the milk and found no *Salmonella*. The FDA spent three days investigating the Alta Dena Dairy and found nothing of importance. The California State Health Department nevertheless issued warnings to the people of California not to drink Alta Dena raw milk, or even give it to their pets.

Also in 1983, the report describing five serious *Salmonella* cases at the Veterans Administration Medical Center in San Diego was published. Three of the five patients were regular consumers of Alta Dena raw milk, and one, a patient with advanced cancer who had been receiving extensive chemotherapy, died with an acute *Salmonella* infection. It is certainly possible that Alta Dena raw milk was the carrier of the *Salmonella* that infected this woman. The dairy did its best to produce a large volume of raw milk for the people of California, but it was not a pasture-based dairy. Mistakes were undoubtedly occasionally made, and milk may have occasionally been contaminated with *Salmonella* or other pathogens. Since the State Health Department reports cannot be trusted, it is impossible to know how often that may have occurred. But to expect or demand perfection from any dairy would be ludicrous, and *any* raw food may on occasion carry pathogenic organisms that may precipitate illness in susceptible individuals. The point is that people need and have a right to choose carefully produced raw dairy products despite the fact that contamination may occasionally occur. The proper role of the public health authorities is to help producers make the best possible products and ensure that any contamination is minimal, and then to take proper steps to protect the public when and if contamination

occurs. For proponents of raw milk to claim that problems never occur is to avoid reality and play into the hands of bureaucrats who would seize upon rare and isolated problems as an excuse to condemn all raw milk.

For that is exactly what the California State Health Department did. Ignoring all the evidence on the benefits of raw milk and the desire of many people to consume it, the Department used the *possibility* of occasional *Salmonella* contamination as an excuse to wage a vendetta against Alta Dena and California's other raw milk producers.

In 1984, an article in *Vogue* headlined "A Raw Milk Warning: A New and Dangerous Health Fad" featured statistics published in the newsletter of an organization called California Council Against Health Frauds. The report claimed that raw milk drinkers were at increased risk of *Salmonella* infection, "which can result in high fevers and bloody diarrhea." This is extremely rare for most *Salmonella* infections. People who drink raw milk are 118 times more at risk, said the article. This exaggeration was obtained by manipulating figures originally published in 1944.

In 1991, Consumers Union of the United States joined with California's conventional dairy producers to file suit against Alta Dena Dairy for advertising, allegedly falsely, that raw milk was healthful and pasteurized was not. The State Health Department concurrently claimed raw milk products were a public health hazard and prohibited Alta Dena from distributing and selling its raw milk pending settlement of the Consumers Union suit. In 1992, the court ruled that Alta Dena's health claims were illegal and ordered all raw milk sold in California to carry a government warning. The Steuves then sold Alta Dena Dairy, but continued to produce and distribute raw dairy products under the Steuve's Natural label.

In 1997, John Leedom, MD, one of the six members of the Los Angeles County Medical Milk Commission, publicly stated that not only licensed grade A raw milk but also certified raw milk should be banned in Los Angeles County. Alta Dena produced licensed grade A raw milk that was also certified by the Commission; California's other licensed grade A raw milk producers were not certified. Three other commissioners sided with Leedom. According to James Privitera, MD, one of the two commissioners who favored keeping raw milk available, the majority implemented regulations so restrictive and prejudicial that it became impossible for raw milk producers

to stay in business. Alta Dena's new owners at that point stopped selling raw milk, and Steuve's Natural raw milk has not been available since May 1999. We'll pick up the story of what's happened with raw milk in California subsequently in Chapters 16 and 17.

MILK-ASSOCIATED ILLNESS TODAY

My familiarity with the work of Weston Price and my clinical experience have convinced me that most illness is the direct result of eating processed foods. Dairy foods—nearly 100 percent of which are highly processed—make up a significant portion of the diet of most Americans. So it is no exaggeration to state that pasteurized, homogenized milk and milk products are closely associated with most of the disease with which Americans suffer.

And suffer we do. Nearly 600,000 Americans die of heart disease every year, and almost as many die of cancer. One of every 15 adults is diabetic. Forty-three million of us have been diagnosed with arthritis. With just five percent of the world's population, America has over 12 percent of the multiple sclerosis patients. Allergies afflict about 38 percent of all Americans, according to a recent survey. Untold millions of children suffer with ear infections and undergo subsequent surgical treatment. The incidence of all of these and most other diseases has risen drastically during the past 100 years. And during those years, processed pasteurized dairy foods have replaced fresh raw milk products in the diet of nearly all Americans.

Most of us think of milk-associated illness as acute gastrointestinal distress caused by consuming a tainted particular portion of milk or a milk product. When we examine problems of this nature reportedly caused by both pasteurized and raw milk, we should keep in mind the full range of chronic illness in America today. The lack of good quality raw dairy foods and the generally poor quality of their modern processed counterparts have played a fundamental role in the deterioration of our national health.

A FAMOUS PEDIATRICIAN

EXHORTS AMERICANS TO GIVE UP MILK

In 1983, Frank Oski, MD published what became a very influential book entitled *Don't Drink Your Milk*. Oski was Chairman of the Department

of Pediatrics at the State University of New York Upstate Medical Center; he subsequently became Director of the Department of Pediatrics at the Johns Hopkins University School of Medicine and Physician-in-Chief at the Johns Hopkins Children's Center. He has been characterized as America's leading pediatrician.

"Milk has been linked to iron-deficiency anemia in infants and children," Oski writes. "It has been named as the cause of cramps and diarrhea in much of the world's population, and the cause of multiple forms of allergy as well; and it may play a central role in the origins of atherosclerosis and heart attacks.

"Among physicians, so much concern has been voiced about the potential hazards of cow milk that the Committee on Nutrition of the prestigious American Academy of Pediatrics, the institutional voice of practicing pediatricians, released a report entitled, 'Should Milk Drinking by Children Be Discouraged?'"⁶⁵

About one-fifth of all infants under two in America suffer from iron-deficiency anemia, about half of which, according to Oski, is due to low-grade intestinal bleeding induced by sensitivity to milk. The amount of blood lost is too small to be detected visually, but is enough to lead to anemia.⁶⁶

Oski links a number of other symptoms to milk allergies including persistent or recurrent nasal congestion, asthma or chest infection, skin rashes, and otherwise unexplained vomiting or diarrhea. These are all problems that I too have seen in many infants and children who consumed regular store-bought milk and milk-based formulas. Other investigators have linked kidney disease, eczema and rheumatoid arthritis to milk, and this too is consistent with my experience; I've long observed that regular milk is one of the worst and most obvious triggers for children with eczema or rheumatoid arthritis.

Other investigators have published studies linking modern milk consumption to multiple sclerosis, amyotrophic lateral sclerosis (Lou Gehrig's disease), anti-social behavior in children and juvenile diabetes.^{67,68} Of course, neither Oski nor any of these other investigators appear to have considered the possibilities of raw milk.

ALLERGIES AND ILLNESSES ASSOCIATED WITH PASTEURIZED MILK

For many individuals allergies are the clearest manifestation of acute illness caused or aggravated by milk and other dairy products. Many articles in medical journals describe allergies to milk in babies and young children. The authors never mention the fact that the allergies are always to *pasteurized* milk; the alternative of raw milk goes unrecognized and unmentioned. In one study, 59 of 787 babies studied were found to have the classic allergic symptoms of recurrent nasal congestion and bronchitis, eczema, diarrhea or repeated vomiting in response to pasteurized milk or milk-based formula. In other studies the percentages of babies allergic to milk have been even higher. These children saw their doctors much more frequently and required hospitalization more often than children who were non-allergic. The earlier the babies were exposed to pasteurized milk, the more likely they were to show signs of intolerance.⁶⁹

A more serious complication was described by investigators who worked with ten- to thirteen-year old children with a kidney disease called nephrosis, which involves the loss of excess amounts of protein from a damaged kidney. Fluid accumulation with swollen hands and feet is commonly the result, and the problem can lead to permanent renal disease and death. When pasteurized milk was removed from the diet, the children showed signs of marked improvement, and when the milk was reintroduced, the problems returned. The researchers concluded that sensitivity to milk and other foods played a prominent role in causing the disease. Unfortunately, in this as in other studies, the investigators made no attempt to give raw milk and note the results.⁷⁰

Other physicians have observed additional relationships between pasteurized milk and allergic disease in children. Eczema, musculoskeletal pain (“growing pains”), rheumatoid arthritis and strep infections are just a few of the problems pediatricians have alleviated by eliminating milk from the diet.⁷¹ In my own experience, there is not a single problem that occurs in infants and young children that cannot be helped by eliminating pasteurized milk and dairy products from the diet. Upper respiratory symptoms, frequent ear infections and asthma are often the most obvious symptoms, but virtually any complaint may be a manifestation of allergy to pasteurized

milk, as well as to other processed foods. Of the hundreds of children I've treated, virtually every child whose parents have been willing to eliminate these foods from the child's diet has had marked improvement in symptoms, often with subsequent progress to vibrant good health. Just how far that progress can go is generally determined by the willingness of the parents to learn and implement the principles taught by Weston Price—no easy task but one that can be accomplished when people are willing and have a good teacher.

Physicians have also noted a number of interesting and disturbing relationships between the consumption of pasteurized milk and several serious chronic diseases. Investigators at the Baylor College of Medicine found that the factors that characterized patients with Lou Gehrig's disease included exposure to lead and mercury and high consumption of pasteurized milk.⁷² A number of pediatricians have noted milk allergy in juvenile rheumatoid arthritis. In *Don't Drink Your Milk*, Oski quotes pediatrician Dan Baggett:

"I have had several children with signs and symptoms of early rheumatoid arthritis. Without exception, during the past eight years, I have had the good fortune to relieve them and watch their certain return to good health by simply eliminating all traces of milk from their diet."⁷³ Oski notes that many other pediatricians have had similar experiences. He also comments on the "many subtle and puzzling forms" milk allergy may take.

Other investigators have found a relationship between heavy milk drinking and antisocial behavior. Young criminals were found to drink almost ten times the amount of milk that was drunk by the control group.⁷⁴

It is heartening to note that elements of the medical establishment are realizing that pasteurized milk and milk products play a key role in causing these various problems. But it is disheartening that physicians still lack understanding of the beneficial role of raw milk. The position of the CDC, the FDA, the federal, state, and local public health services, the medical journals, and every professional organization in the conventional medical, veterinary, and public health professions is one of overwhelming opposition to raw milk. This makes it difficult or impossible for the individual physician, pediatrician or otherwise, to suggest raw milk for his or her patients.

We turn next to the subject of bacteria in milk, and then examine

reports about occasional outbreaks of gastrointestinal illnesses that have been associated with consumption of raw milk. We'll also examine how these same problems can occur in pasteurized milk and milk products.

BACTERIAL ILLNESS ASSOCIATED WITH MILK

Freshly drawn milk always contains some bacteria. These come from the surface of the udder, the hands of the milker if a machine is not used, and from the udder itself. Fresh milk is rarely, if ever, germ-free, but the number and types of bacteria are different in different cows. Healthy milk glands secrete sterile milk, but the milk ducts in the teats of the cow afford a pathway for the invasion of the udder. The germicidal power of the milk itself prevents most but not all bacterial invasion of the udder via the milk ducts.

Even bacteria well adapted for growth in milk die off when introduced into perfectly fresh milk. "Investigators agree that milk, like serum, possesses a genuine germicidal power," wrote Edwin O. Jordan in his 1936 *Textbook of General Bacteriology*. "The action is different for different species of bacteria, and the milk from one animal may be more actively bactericidal than that from another."⁷⁵ A 1976 article in *The Lancet* confirmed that ". . .in cow's milk an antiviral activity has been detected which does not seem to be related to antibodies or other known virus inhibitors . . .activity was lost after treatment at about 100 degrees C for 30 minutes . . .We think that the effect is likely to be due to an unknown substance or substances but much further work is required to characterize this."⁷⁶

Bacteria from the udder form only a part of the total number of bacteria in milk; the skin of the cow and the vessels used for collection also contribute. Milking fully healthy animals under aseptic conditions results in a bacteria count as low as 200 to 400 per milliliter. Collected with somewhat less care, it may contain 2000 to 6000; with careless collection (or unhealthy animals) the counts in fresh milk may range from 30,000 per ml to 100,000 per ml or more, indicating a high degree of contamination.

Milk is a particularly favorable medium for bacterial growth; the rapidity of growth depends upon temperature. Even quite clean milk, with an initial count of 2,500 per ml and kept at 40 degrees Fahrenheit, develops a count of over 200,000 per ml four days later. Milk with an initial count of

38,000 per ml shows a count of over 4 million per ml four days later (the same milk kept at 68 degrees Fahrenheit shows a count of over 4 million in just 24 hours). Generally, these are beneficial bacteria, produced by normal lactic-acid fermentation.

However, when pathogenic bacteria are present, as was the case with distillery milk and other milk produced under unsanitary conditions for sale in the cities throughout the nineteenth century and well into the twentieth, rapid proliferation results in a dangerous product. Investigators at the turn of the last century reported that raw milk from shops in New York City and Boston averaged from 300,000 bacteria per ml in the coldest weather to 5,000,000 per ml in the hottest; in Chicago, counts ranged as high as 74,000,000.⁷⁷ When pathogens are present, the likelihood of infection occurring is determined in part by their concentration. Summer epidemics in the cities, with high death rates in young children, were common occurrences in the nineteenth century, and sloppily produced and contaminated milk was definitely a contributing factor. The quick fix of pasteurization and continued cheap milk—as opposed to legislation and enforcement to insure a supply of clean but more expensive milk from healthy animals—appealed to politicians and public health authorities in those days as much as it does today.

Milk may be infected with pathogenic bacteria either directly from the cow, or by contamination with bacteria from people. In years past, before the introduction of the modern milking machine, cows were generally healthier than today (except in the distillery dairies), but contamination from milkers and handlers was common. Individuals milking cows or handling milk were sometimes suffering from sub-acute cases of typhoid fever, tuberculosis, cholera, diphtheria, scarlet fever or strep throat, all of which could easily contaminate the milk. Contamination of milk also resulted when improper raw sewage disposal made its way into water supplies used to rinse milk cans and utensils. Flies sometimes carried typhoid bacilli from infected feces to milk.

Mastitis—inflammation of one or more of a cow's four quadrants of the udder—can be provoked by a variety of organisms that may cause diarrhea and also pass into the milk via the udder. "On more than one occasion the use of milk from udder-sick cows has been followed by illness,"

Jordan wrote. “and the epidemiologic connection between sudden attacks of illness and the use of the milk of cows suffering from diarrhea is undoubted.” Mastitis and diarrhea in cows often go hand in hand. Clinical and subclinical mastitis is all too common in the confinement operations that produce a majority of America’s milk today.

CAMPYLOBACTER

Salmonella and *Campylobacter* are generally recognized as the two leading bacterial causes of dairy-related illness in the United States and Western Europe today.⁷⁸ According to Dr. Ryser, between 1978 and 1986 some 700 reported cases of campylobacteriosis in this country were associated with ingestion of raw milk. Gastrointestinal illness caused by these organisms is “generally not serious,” according to an article in *The Western Journal of Medicine*, but may be serious in people taking immunosuppressive drugs such as cancer chemotherapy agents or radiation therapy.⁷⁹ The total number of cases of illness associated with *Campylobacter* from all foods is vast and now rivals the number of cases associated with *Salmonella*. Each organism causes an estimated two million cases per year in the United States.

While it is not known precisely how most of these cases originate, “. . . the route for human infection is through the ingestion of adulterated food and drink,” according to a recent article in the *Journal of Animal Science*. “Some slaughter animals harbor this potential pathogen among the intestinal flora and, consequently, transfer of the organism to carcasses and to the resulting meat products does occur [i.e., feces contaminate the meat]. The most frequently implicated meat is poultry, with an incidence of recovery of *Campylobacter* from the store-bought poultry meat reported to be at least 50%. Red meat from slaughter animals has also yielded this bacterium . . . appropriate sanitary practices to prevent passage of the organism through meat products should be implemented.”⁸⁰ In other words, let’s get the feces out of the meat. Adding insult to injury is the fact that chicken manure is routinely fed to cattle (over three million pounds in Arkansas in 1994 alone, according to a study published in *Preventive Medicine*).

Instead of addressing problems occurring in modern foods, the federal and state public health agencies have concentrated on restricting the availability of raw milk. The production of any raw animal product has

certain inherent risks that are a legitimate area of public concern. But instead of treating raw milk farmers fairly and reasonably enforcing regulations to protect the public when occasional problems occur, the authorities in most states have used minor violations as an excuse to harass farmers and generate biased publicity. The double standard is obvious. If we prohibited the sale of any raw food that caused illness, we would not be able to buy raw oysters, raw eggs or raw meat.

In fact, public health policy increasingly ignores the threat of contamination in foods produced by big business. Consider the following passage from *Fast Food Nation*:

“One of the Bush administration’s first food safety decisions was to stop testing the National School Lunch Program’s ground beef for *Salmonella*. The meatpacking industry’s lobbyists were delighted; they had worked hard to end the testing, which the industry considered expensive, inconvenient and unnecessary. But consumer groups were outraged. In the ten months that the USDA had been testing ground beef intended for school-children, roughly five million pounds were rejected because of *Salmonella* contamination. The decision to halt the tests generated a fair amount of bad publicity. Three days after it was announced, Secretary of Agriculture Ann M. Veneman said that she’d never authorized the new policy, reversed course, and promised that the school lunch programs *Salmonella* testing would continue.”⁸¹

America’s food contamination problems are not insurmountable. David M. Theno, a food scientist, helped Foster Farms, a poultry processor in California, eliminate most of the *Salmonella* from its birds. He also helped Jack-in-the-Box clean up meat contamination problems. He is an advocate of Hazard Analysis and Critical Control Points (HACCP) programs, a food safety philosophy also promoted by the National Academy of Sciences. Theno suggests that slaughterhouses be graded according to the cleanliness of the meat they produce. Microbial testing would determine the grades and grading would strongly influence marketplace pricing. Obviously, a similar system could be implemented in the production of milk.

Theno says, “If you put in a score-keeping system and profile these meatpacking companies you can fix this problem. You can actually fix this problem in six months. . . . This is a matter of will, not technology.” The

cost of the food safety program Theno implemented at Jack-in-the-Box cost the company about one penny per pound of ground beef.⁸²

Although occasional outbreaks of *Campylobacter* have occurred in raw milk, the largest dairy-related outbreaks associated with *Campylobacter* have occurred in pasteurized milk. *The British Medical Journal* reported on a 1979 incident: “In an extensive outbreak affecting about 3500 individuals (mainly children under 8 years old) a statistical association was shown between drinking free school milk and the development of symptoms. Pasteurization of milk from the large dairy in question had failed in the week before the outbreak. There was no other linking factor.” Another incident involved 616 cases resulting from a pasteurization failure. Most of the article, however, is devoted to 11 other incidents that involved some 300 cases associated with and possibly caused by the consumption of raw milk. Having demonstrated that 93 percent of the cases discussed in the article were associated with pasteurized milk, the authors then concluded “. . . only pasteurized milk should be sold to the public.”

They also wrote that “The great majority of human isolations of *Campylobacter* are from cases commonly described as ‘sporadic’ or ‘isolated’ . . . it is unlikely that a large proportion of sporadic cases of campylobacter enteritis infection are milk-associated.”⁸³ A year later, an American medical journal used this article as a reference for the statement: “In Great Britain unpasteurized (raw) milk has been described as the major vehicle of transmission in human outbreaks of enteritis caused by *Campylobacter*.”⁸⁴ While technically true, the statement is extremely misleading. The vast majority of cases are isolated and caused by foods other than raw milk. An “outbreak” is defined as a cluster of cases from a common source, and a few “outbreaks” ascribed to raw milk lead to the characterization of raw milk as “a major vehicle of transmission,” even though raw milk causes only a tiny minority of the total number of cases. Such distortion serves the purpose of further biasing physicians, who are the primary readers of the journal, against raw milk. Actually, “. . . sporadic cases—which account for the lion’s share of the disease—are most often associated with the consumption of poultry and poultry products,”⁸⁵ according to a 1994 editorial in the *Western Journal of Medicine*.

Bias against raw milk in medical journals stems from the modern view

of disease. Conventional medicine is fully committed to the use of drugs rather than food in the treatment of illness. A significant percentage of the population at any given time is taking immunosuppressive drugs, including chemotherapy agents, corticosteroids and antibiotics. These people are at increased risk of bacterial infection from any source. The medical profession has a far greater interest in protecting them from any possible raw milk-related illness than it does in maintenance of health in everyone else, or even in the improvement of health in the immunosuppressed through superior foods.

The medical profession has little understanding of the relationship between animal health and milk quality. In the *Western Journal of Medicine* article that castigates raw milk, we read the following: “. . . 60 percent of healthy cattle excrete *Campylobacter* in their feces . . . Present technology cannot prevent or eradicate *Salmonella* and *Campylobacter* infection in milking herds, nor can it prevent contamination of milk produced by such infected cattle. Because occasional fecal contamination occurs during the milking process despite the best efforts of dairies to prevent it, the result is human infection and disease unless milk is pasteurized.”⁸⁶ Actually, healthy cattle do *not* excrete *Campylobacter* (more on this in Chapter 15) but the cows that make up a majority of America’s milking herds are not healthy. With proper care, “occasional fecal contamination” becomes rare. Even when it does occur it need not cause illness.

There is no question that even small numbers of *Campylobacter* in milk can cause illness. An English physician reported becoming ill with mild diarrhea after deliberately ingesting just 500 organisms, and the same serotype of *Campylobacter* that he ingested was found in his feces.⁸⁷ And a number of reports in both Great Britain and the United States have made it clear that *Campylobacter* has occasionally caused illness in raw milk drinkers, including those using milk from licensed raw milk dairies.

Nevertheless, charges against raw milk often lack real proof. Quoting Dr. Ryser on *Campylobacter* infections: “Despite the many aforementioned outbreaks, confirmation of raw milk as the source of infection has remained difficult. Only three reports have appeared in which the epidemic strain was recovered from a portion of the lot of milk that was consumed.”⁸⁸

An outbreak of *Campylobacter* associated gastrointestinal illness in

190 raw milk drinkers in Arizona is one of the more clear-cut cases.⁸⁹ An 82-year-old woman checked into a hospital in Tucson in May of 1981 with diarrhea, abdominal pain and fever. *Campylobacter jejune* bacteria were found in both blood and stool. Bacteria in the blood (bacteremia) is a sign of potentially severe illness. When her history revealed that she habitually drank five glasses of raw milk from a local dairy each day, the Health Department began an epidemiological investigation, contacting physicians, hospitals and laboratories in the Tucson area and requesting that people with recent gastrointestinal illness call the health department. Thirty-nine cases were found in this way, a case being defined as a person with diarrhea and other symptoms who drank raw milk from the dairy during the week before the illness began.

The dairy had been in operation for over 20 years and at the time was producing about ten thousand gallons of milk per week from 200 cows. Seven thousand gallons were pasteurized and three thousand were sold raw.

Raw milk drinkers included members of a natural foods coop, and patients of a chiropractic physician who recommended raw milk from the dairy to many of his patients and operated a number of health food stores that sold the milk. Investigators interviewed many of these people to determine whether raw milk drinkers were experiencing more gastrointestinal illness than people who were not raw milk drinkers. A telephone survey resulted in contact with nearly 200 households that contained 241 people who drank raw milk from the dairy and 77 people who did not. Of the raw milk drinkers, 190 had experienced gastrointestinal illness, with no cases among the individuals not drinking raw milk.

Laboratory studies were also performed. Stool samples from 58 of the people who became ill were tested, and *C. jejuni* was found in 37 (64 percent). Samples of raw milk did not test positive for *Campylobacter*, but by the time testing was done, the outbreak had subsided. However, stool samples of nearly half of the cows tested positive for the organism. While there is no absolute proof that raw milk caused the outbreak, the statistical evidence strongly implies that it did. The outbreak was an important factor in the subsequent passage of a law in Arizona banning the retail sales of raw milk.

There are a number of lessons to be learned from this case. Those

raw milk advocates who maintain that raw milk never causes illness should take a good look at the statistics and understand that just as other tainted raw foods can cause disease, so too may raw milk. As such, the public health authorities have a legitimate interest in assuring that raw milk sold to the public has minimal exposure to contamination. But the authorities should also consider the fact that the Arizona dairy sold thousands of gallons of raw milk weekly for some 20 years with a minimum of problems. Raw milk can be regulated in a reasonable way to assure safety and a minimum of problems. When a problem does occur, officials should take fair-minded steps to correct it without driving the producer out of business, while dealing sternly with repeat offenders and those who abuse the system, be they sellers of meat, milk, or pork and beans. Making all food sterile—free of all bacteria—is not a valid goal. Rather, the authorities should concern themselves with quality as well as safety, while protecting the public’s freedom to choose.

IRRADIATION PASTEURIZATION: THE ULTIMATE IN “FOOD SAFETY”

A 1997 article in *Emerging Infectious Diseases*, titled “Irradiation Pasteurization of Solid Foods: Taking Food Safety to the Next Level,” discusses irradiation as the most effective way to sanitize the food supply.⁹⁰ “Irradiation pasteurization of solid foods with low doses of gamma rays, X-rays, and electrons will effectively control vegetative bacterial and parasitic foodborne pathogens,” claim the authors. “Recent outbreaks of foodborne illness associated with undercooked meat and uncooked fresh produce, and the emergence of previously unrecognized foodborne hazards . . . have stimulated interest in methods of pasteurizing solid food without altering its raw appearance . . . Irradiation pasteurization is a well-established process with clearly documented safety and efficacy that can be put into widespread use as quickly as facilities can be sited and built.”

The authors make no mention of the many studies that question the safety of irradiated foods. “Reports on public antipathy toward things radioactive” are attributed to “considerable consumer confusion and ignorance about food irradiation.” The fact that proper attention to sanitation in food production results in safe foods is dismissed with the statement that “the

residual risk for infection that remains after state-of-practice sanitation during production, harvest, processing, distribution, and preparation yields an unacceptable level of illness and death.” Notice the words “state-of-practice” rather than “state-of-the-art.” In other words, the way food is produced today results in illness and death. Rather than cleaning up the process, the authors propose irradiation to sanitize the results.

The authors note that when milk pasteurization was introduced, promoters of the process had to overcome widespread public concerns that “the new thermal pasteurization technology would corrupt the dairy industry, destroy the nutritional value of milk and lead to serious public health problems.” Those concerns, of course, have proven valid. Consumers and scientists have expressed similar concerns over the prospect of widespread irradiation of solid foods, including meats, poultry, seafood, vegetables and fruits.

Notice that the irradiation process is to be accomplished upon solid food “without altering its raw appearance.” Just as the producers of genetically modified foods and milk tainted with bovine growth hormone have resisted attempts by consumer groups to require labeling of these products, the purveyors of food irradiation plan to sell products that appear normal and are not labeled as irradiated. Indeed, they may well follow the lead of distributors of milk produced with bovine growth hormone that lobbied for laws forbidding farmers who produce milk without the hormone from labeling their products as bGH-free. The technology will meanwhile be portrayed as harmless and indeed beneficent, one more way America’s industrial expertise is helping to feed a starving world. Do not be surprised if pictures of starving children are brought into the marketing effort, children to be saved by the bounty of bioengineered crops, bGH-produced milk and irradiated foods. The fact that widespread irradiation of foods would solve the nuclear industry’s toxic waste problems receives little attention in either the marketing campaign or a generally adoring press.

Ironically, the push to irradiate is aided each time another batch of meat is found to be contaminated with pathogenic bacteria. In November and December of 2002, 19 million pounds of raw hamburger were recalled for possible *E. coli* contamination, with subsequent calls for irradiation. Irradiated meat is now being sold in thousands of stores throughout America

and more irradiation plants are under construction. Fast food restaurants are selling irradiated burgers, and schools are using irradiated meats. The FDA is thought to be close to approving the irradiation of all deli meats and many other foods, including seafood, juice, bagged salads, cut fruits and peeled vegetables. Government grants have been given in support of educating consumers about “the benefits of irradiation,” which is euphemistically called “cold pasteurization” and “safety-enhancement” (presumably in deference to “reports on public antipathy toward things radioactive” and “consumer confusion and ignorance about food irradiation”). The obvious aim of the industry is to leave people with no choice but to eat irradiated foods, just as most people have no choice but to use pasteurized dairy foods.⁹¹

With help from the US government, the industry is making considerable progress toward its goals. The farm bill that was passed in May 2002 directs the Agriculture Department to buy irradiated beef for the federal school lunch program. This is what the Bush administration asked for in 2001: irradiated beef in the school lunch program, in place of testing for bacterial contamination. School lunches fall under the jurisdiction of Dr. Peter S. Murano, the deputy administrator of the Food and Nutrition Service. He and his wife have written extensively about the use of irradiation on foods, and she formerly ran the food irradiation program at Iowa State University.

One farm bill provision, added by Senator Tom Harkin of Iowa, directs the FDA to find a less fear-inducing word than “irradiation;” we may soon be looking at meats labeled with words that include “pasteurized” or some other euphemistic phrase. Harkin also added the language in the bill that directs the Agriculture Department to buy irradiated meat. *The New York Times* described Harkin’s connections to the industry as follows:

“The same month the farm bill passed, according to the Federal Election Commission in 2002, Senator Harkin received a \$5,000 campaign contribution from the Titan Corporation, which until last August owned the SureBeam Corporation of Sioux City, Iowa, the country’s largest food irradiator.” The same *Times* article warns of the uncertainty and dangers of food irradiation, and indicates how governments feel about the process in countries where the industry is less cozy with top elected and appointed

officials: “Based on European studies showing the formation of cancer-causing properties in irradiated fat, the European Union, which allows irradiation only for certain spices and dried herbs, has voted not to permit any further food irradiation until more studies have been done.”⁹²

JUST HOW DANGEROUS ARE PATHOGENS, ANYWAY?

A recurring theme in this book has been the importance of each individual’s immunity in resisting the potentially harmful effects of pathogenic bacteria. This topic emerged in a January 5th, 2000 *Los Angeles Times* article titled “The Great Egg Panic: New proposals rekindle the debate over eggs’ safety. But some scientists say the fears are overblown.”

“New government proposals designed to check salmonella poisoning could force routine pasteurization or irradiation of the American egg supply,” the article reads. Officials argue that because 300,000 Americans are sickened and hundreds die each year from *Salmonella* in eggs, eggs should be irradiated. “Today’s egg, the new wisdom dictates, is too frequently contaminated with a bacterium called *Salmonella enteritidis* to be eaten as eggs always have been: sunny side up, in mayonnaise, cracked raw over hot pasta and grated with Parmesan cheese or simply soft-boiled and spooned worshipfully from a cup.” Other officials disagree, including Peter Hutt, former chief counsel for the FDA. He calls the statistical modeling that produces the food poisoning statistics “the closest thing I can think of in this modern age to a Ouija board.” Now a lecturer on food safety at Harvard University, Hutt says, “The statistics are all over the place because none of them are any good. They are all wild guesses.”

So while it is clear that many commercially produced eggs contain *Salmonella*, it’s not at all clear how many, or how many problems this may lead to, or why some people are affected while most are not.

According to John R. Roth, a professor of biology at the University of Utah who has been studying *Salmonella* for 40 years, “. . . probably it [*Salmonella*] exists in very many organisms at a low level where it’s not a pathogen but living as part of the gut flora.” The idea of banishing it, he says, is absurd. “*Salmonella* is distributed pretty widely, and if you’re willing to look closely enough, you’d probably find it almost everywhere. Sometimes it makes a mistake and gets across the gut wall and into an organism.

Then it has all these mechanisms for surviving known as virulence.” In the vast majority of cases, that virulence manifests as an irritation in the gut wall where the immune system fights off the bacteria, and symptoms range from loose stools to flu-like illness. In rare cases, the infection reaches the bloodstream, and occasionally these cases may be fatal. *Salmonella*-induced fatalities almost always involve individuals who are immunosuppressed from previous drug therapy. According to the Centers for Disease Control in Atlanta, between 1985 and 1998 there were 79 verified deaths, about 5 a year—one-tenth the number of people killed in the US each year by lightning.

Roth’s point that *Salmonella* is literally everywhere is important, for it confirms two things. First, there is no point in sanitizing the food supply, because contamination with *Salmonella* and other organisms can just as easily occur after pasteurization, irradiation or whatever other process is used to sanitize. Second, the individuals who become ill as a result of exposure do so because their immune systems are functioning abnormally.

Actually, regular exposure to organisms such as *Salmonella* can build resistance and immunity. In effect, we may make ourselves stronger and healthier by eating raw foods that may contain organisms considered “pathogenic.” That is why regular raw milk drinkers were much less likely to become ill during outbreaks of illness attributed to raw milk than first-time raw milk drinkers. According to a 1985 report, “Persons, regardless of age, who are routinely exposed to *Campylobacter jejuni* by vehicles such as raw milk may develop some protective immunity. [This is] supported by several serological studies . . .”⁹³

During one *Campylobacter* outbreak “. . . none of the chronic raw milk drinkers became ill after ingesting large amounts of the same milk that caused a high attack rate among those persons who were acutely exposed . . . Presumably this phenomenon is due to previous exposure to *Campylobacter* with subsequent development of immunity . . . this investigation confirms the presence of these antibodies [to *Campylobacter*] in persons chronically exposed to raw milk and for the first time, to our knowledge, shows an association between high antibody levels and immunity to infection under field conditions.”⁹⁴

Quite simply, these studies confirm the fact that raw milk drinkers

develop powerful immunity and resistance to pathogenic organisms. The same journals that provide this information have continued to demand a complete ban on raw milk, including a ban on farmers giving the product away to neighbors and friends.

GRASS-FED IS SAFEST

Back in 1936, Edwin Jordan, author of *A Textbook of General Bacteriology*, pointed out that “The character of pasture was early observed to affect the kind and abundance of the species [of bacteria] found in milk; the lack of pasture in more recent years has been demonstrated to have a profound effect.”⁹⁵ Numerous studies have confirmed that current feeding methods utilizing large quantities of grains have had a profound effect on the kind and abundance of bacteria found in milk, much to the detriment of the health of the animals and the quality of the milk.

Of particular relevance is the development of acid-resistant strains of bacteria in modern cattle. According to a 1998 *Science* magazine article, cattle fed mostly grain have a lower intestinal pH (more acidic) and are more likely to harbor pathogenic bacteria than cattle fed mostly grass and hay. The abnormally low pH in which the bacteria develop makes these bacteria acid-resistant. “The ability of bacteria to act as food-borne pathogens depends on their capacity to survive the low pH of the [human] gastric stomach and to colonize the intestinal tract of humans,” the authors write. “Cattle that were fed grain had one million-fold more acid-resistant *E. coli* than cattle fed hay.”⁹⁶

These acid-resistant pathogenic bacteria from heavily grain-fed, overly acidic cattle have an increased ability to survive the acid environment of the human stomach and subsequently colonize the intestinal tract and cause disease. This is a major reason why raw milk (or meat) from grass-fed cows is so much safer than milk from animals kept largely or entirely in confinement and fed mostly grains and silage.

Mark McAfee, owner of Organic Pastures Dairy, California’s first certified organic, pasture-based raw milk dairy, has recently provided considerable evidence of the safety of raw milk from cows that are primarily pasture-fed. He keeps his cows on fresh green pasture all year; in addition, each is fed about 30 pounds of fresh-cut alfalfa hay and eight to ten pounds

of grains daily. The milk is tested daily on the farm with a state-of-the-art machine to assure compliance with raw milk standards set by the California Department of Food and Agriculture, which also regularly tests the milk. The standards for market Grade A milk require that raw milk sold to consumers contain less than 15,000 bacteria count per milliliter. The farm posts the results of their daily test on their web site.⁹⁷ The average bacteria count per milliliter since beginning operations is 1,354 (the highest ever was 8,000, the lowest 10). Since Organic Pastures began selling raw milk in January 2002, neither McAfee nor the state has found a single pathogenic bacterium. This is extraordinarily clean milk.

McAfee recently took samples of his milk to a laboratory in Fresno where technicians introduced pathogens into the milk—*Salmonella* and *E. coli* OH:157. The organisms could not be found in the milk the next day—they could not survive. A researcher from the University of California at Davis then came to the farm and took serum samples from several cows. She discovered that the animals had developed no antibiotic resistance. What this means is that the immune systems were so strong that the good bugs the cows naturally harbor are able to kill off potential pathogens such as *Salmonella* and *E. coli* 0157. Drinking this milk populates the human intestines with the same good bugs, which is one reason the studies described above have shown that people who drink raw milk consistently are much more resistant to potentially pathogenic organisms than those who do not.

GERMS THAT DO THE BODY GOOD

While the FDA and CDC chase the impossible goal of creating a germ-free food supply, other branches of the medical profession are exploring the many advantages of beneficial microorganisms. The use of beneficial bacteria to kill disease-causing microbes is called probiotics. Various studies have shown the benefit of lactic-acid producing bacteria in stimulating the activity of white blood cells, eliminating diarrhea, reducing inflammation in the colon, and protecting against infections of the ear, bladder and reproductive tract.⁹⁸

In scientific studies, researchers administer these healthy bacteria by adding live strains to juice, yoghurt, beverages or . . . pasteurized milk. Because of the anti-raw-milk agenda, scientists reporting to the medical jour-

nals are constrained from stating the obvious: raw milk naturally contains disease-fighting lactic-acid-producing bacteria. If raw milk were a normal part of the American diet, we would receive daily protection against disease-causing organisms.

In the next chapter, we'll examine why grass-fed milk is not only the safest, but the healthiest as well. Indeed, safety and healthfulness in high quality raw milk go together.