Prisoned Chickens Poisoned Eggs

An Inside Look at the Modern Poultry Industry

Karen Davis, Ph.D.

Book Publishing Company
Summertown, Tennessee

Book Publishing Company
P.O. Box 99
Summertown, Tennessee
1-800-695-2241

Cover design by Warren Jefferson

ISBN 1-57067-032-3

99 98 97 4 3 2

Davis, Karen, 1944-
Prisoned chickens, poisoned eggs : an inside look at the modern poultry industry / Karen Davis
p. cm.
Includes bibliographical references and index.
ISBN 1-57067-032-3
1. Chickens. 2. Chickens--Diseases. 3. Eggs--Production. 4. Chicken industry. 5. Egg trade. I. Title.
SF487.D27 1996
179'.3--dc20 96-45937
CIP

Karen Davis is the founder and president of United Poultry Concerns, an international non-profit organization addressing the treatment of poultry in food production, science, education, entertainment, and human companionship situations. A portion of the proceeds from the sale of this book goes directly to funding the work of this organization.

"In the tradition of Jeremy Rifkin's *Beyond Beef*, Karen Davis has taken on the poultry industry in her thoroughly researched analysis of the gruesome, dirty and brutal lives of factory-farmed chickens."

Publishers Weekly

"Davis documents the inhumane conditions of factory farming, explicitly detailing the lives and deaths of battery hens raised in tiered brooding trays and of broiler chickens . . . Bolstered by unyeilding conviction, Davis argues her case with passion."

Booklist

Table of Contents

PROLOGUE

He woke up on the floor of the broiler shed with 20 thousand other bewildered young chickens under the electric lights, with the familiar pain in his throat and a burning sensation deep inside his eyes. . . . He saw green leaves shining through flashes of sunlight, as he peeked through his mother's feathers and heard the soft awakening cheeps of his brothers and sisters, and felt his mother's heart beating next to his own through her big warm body surrounding him, which was his world.

A crow had cried out, and another cried out again.

He started—the spry, young jungle fowl was ready for the day, ready to begin scratching the soil which he had known by heart ever since way back when chickenhood first arose in the tropical magic mornings of the early world. In the jungle forest, the delicious seeds of bamboo that are hidden beneath the leaves on the ground are treasured in the heart of the chicken.

The rooster called out excitedly: "Family, come see what food I've found for you this morning!". . .

His aching legs—they brought him back to reality as he closed his eyes stinging with ammonia burn—could not move. They could no longer bear the weight of flesh which bore down upon them, which was definitely not the body of a mother hen. A mother hen, an ancestral memory kept telling him over and over, had once shushed and lulled him to sleep, pressed against her body nestled deep inside her wings fluffed over him when he was a chick. That was a long time ago, long before he was a "broiler" chicken, crippled and incased in these cells of fat and skeletal pain. He was turning purple. His lungs filled slowly with fluid, leaking from his vessels backward through the valves of his heart, as he stretched out on the filthy litter in a final spasm of agony, and died.

Karen Davis, "Memories Inside a Broiler Chicken House"

I remember how wonderful it was to peck my way through the shell and step out into the warm bright dawn of life. I have seen no other sunrise. We live in eternal noontime. My birth was a grievous mistake. And yet an egg is developing in me, as always. I can't stop it. I feel its growth, and despite all my bitterness, tiny surges of tenderness fill me. How I wish I could stop the egg from growing so that I wouldn't have to know these tender feelings. But I can't stop. I'm an egg machine, the best egg machine in the world.

"Don't be so gloomy, Sister. There are better times coming."

The insane hen in the cage beside mine has fallen victim to a common delusion here at the egg factory. "No better times are coming, Sister," I reply. "Only worse times."

"You're mistaken, my dear. I happen to know. Very soon we'll be scratching in a lovely yard."

I don't bother to reply. She's cheered by her delusions. And since our end will be the same, what does it matter how we spend our days here? Let her dream in her lovely yard. Let her develop her dream to its fullest, until she imagines that the wire floor beneath her claws has become warm dry earth. We don't have much longer to go. Our life span is only fourteen months of egg laying and then we're through.

An egg machine!

There's a great fluttering of wings along this cell block, and much loud clucking. The cages are opening, and one by one rough hands grab us.

"You see, Sister. I told you better times were coming. Now we're finally going."

Now we're hung upside down, our feet are tied together with wire.

"You see, Sister. It's just as I told you—the better times have come at last."

We're hooked to a slowly moving belt. Hanging upside down, we're carried along through a dark tunnel. The wire bites into my flesh. Swaying through the darkness we go. The gurgling cries up ahead of us make clear what better times have come.

"Our reward, Sister, is here at last," cries our mad sister.

"We were good and laid many eggs and now we get our reward."

The cry of each hen is cut off so that her squawking becomes liquid bubbling. And then the sound of dripping: drip, drip, drip.

"Oh, I can see it now, Sister, the lovely yard I spoke of, all covered with red flowers and . . ."

The mash runs out of her neck.

William Kotzwinkle, Doctor Rat[1]

INTRODUCTION

I did not grow up around chickens. As is probably the case for most people growing up in post-World War Two America, my personal acquaintance with chickens and other animals on the farm was confined to experiences at the table. There were some brief encounters with baby "Easter" chickens and rabbits way back in childhood, and a long suppressed witnessing of a brown hen beheaded on a chopping block with an axe by a playmate's father.

However, a chicken named Viva changed the course of my life and career.[2] When I met her, I was an English teacher completing my doctoral dissertation in English at the University of Maryland. I had expected to teach English for the rest of my life. Yet during the mid to late 1980s I found myself increasingly drawn to the plight of nonhuman animals in human society, particularly farm animals. The huge number of factory farm animals was astonishing. At the bottom of this pile were the billions of birds imprisoned in intensive confinement systems, totally out of sight. Farm animals were generally dismissed as beyond the pale of equal, or even any, moral concern because, it was argued, they had been bred to a substandard state of intelligence and biological fitness, and because they were "just food" that was "going to be killed anyway."

My experience with Viva, a crippled and abandoned "broiler" hen, put these matters into perspective. Viva was expressive, responsive, communicative, affectionate, and alert. Though she was cursed with a man-made body, there was nothing inferior about her personally. She already had a voice, but her voice needed to be amplified within the oppressive human system in which she was trapped. There were billions of Vivas out there, just as special.

Viva's death was painful, but my knowing her clarified my future. It was not only that Viva had suffered, but that she was a valuable being, somebody worth fighting for. She was not "just a chicken." She was a chicken. She was a mem-

ber of earth's community, a dignified being with a claim equal to anyone else's to justice, compassion, and a life worth living.

This book is dedicated to her and to the making of a future in which every Viva in the world has a voice that is heard.

Chapter 1
History

> It is a far cry from the time that man first heard the crow of the wild cock of the bamboo jungles of India to the cackle of the highly domesticated hen upon celebrating her production of 1,000 or more eggs.
> M.A. Jull, "The Races of Domestic Fowl"[1]

It would be rash to suggest that before the 20th century, the life of chickens was rosy. In the 18th century, the New Jersey Quaker, John Woolman, noted the despondency of chickens on a boat going from America to England and the poignancy of their hopeful response when they came close to land.[2] Behind them lay centuries of domestication, preceded and paralleled by an autonomous life in the tropical forests of Southeast Asia that persists to this day. Ahead lay a fate that premonition would have tried in vain to prevent from coming to pass. This book is about that fate, the fate of chickens in our society.

Chickens are creatures of the earth who no longer live on the land. If there is such a thing as earthrights, the right of a creature to experience directly the earth from which it derives and on which its happiness in life chiefly depends, then chickens have been stripped of theirs. They have not changed; however, the world in which they live has been disrupted for human convenience against their will.

Early History

People have kept chickens for food for thousands of years, probably beginning in Southeast Asia, where it is speculated that one or more species of jungle fowl contributed to the modern domesticated fowl with the possible involvement of other wild birds, such as the grouse.[3] It may be that cockfighting preceded and led to the use of chickens for food, with female game birds being perceived as a source of meat

and eggs. Humans may have discovered that by stealing from the nest eggs they did not want to hatch, or wanted to eat, they could induce the hen to lay compensatory eggs and continue to lay through an extended season. The breeding of hens to encourage egg-laying may have begun as long as five or even ten thousand years ago. Human intervention is certain. Egg-laying as an independent activity detached from the giving of life is not a natural phenomenon in birds. As *The Chicken Book* states, "The chief distinction between domestic and wild fowl lies in the fact that wild fowl (like all wild birds) do not lay a surplus of eggs. Most commonly they lay only in the spring when they are ready to raise a brood of chicks."[4]

The spread of the jungle fowl from the Indian subcontinent westward to the Mediterranean basin, northern Europe, and Africa, and eastward from China to the Pacific islands probably occurred through military and commercial activity. By the fourth century B.C. chickens were established in Persia, Greece, and Rome.[5] The ancient Chinese bred heavy chickens for meat. In Persia and Greece, the birds were objects of sacrifice. Cockfighting spread from India to Persia, the Pacific islands, Greece, and Rome. When Julius Caesar arrived in Britain, he found the native Britons already kept fighting cocks for sport. By the late Middle Ages, cockfighting had spread throughout the Roman Empire.[6]

References to chickens have been found in Egyptian records as early as the fourteenth century B.C. The cock is evoked in poetical and pictorial images and in a royal accounting of tribute from the East, that reads, "Lo! four birds of this land, which bring forth every day."[7] Egypt is the first nation on record to have mass-produced chickens and eggs similar to modern practice. Some four thousand years ago, the Egyptians built fire-heated clay brick incubators that could hatch as many as 10,000 chicks at a time.[8] In *Factory Farming*, Andrew Johnson cites the Roman writer, Varro, to show how in the first century B.C., the Romans maintained specialized chicken farms "with elaborate henhouses equipped with ladders, high roosts, nests and reli-

able trapdoors to keep out foxes and weasels."[9] These houses accommodated from forty to two hundred birds, and, depending on the size, were divided into smaller rooms where cocks and their attached hens could roost separately from other families of birds. Parasites such as mites and lice were controlled by smoke piped from the bakery through the chicken house, and periodic evacuation followed by disinfection of the building was apparently practiced then, as now, to control the diseases that develop through overcrowding.

Johnson dismisses the idea that the pre-factory farming era was idyllic for chickens and other farm animals, suggesting, rather, that factory farming is an extension of age-old attitudes and practices in regard to animals raised for food. Recalling Elizabethan England of the 16th century, he says, for example, that the modern battery-cage building is "little more than a many thousand times larger replica of the housewife's kitchen hen-coop which might at that date have filled in the unused space under the dresser."[10]

Keith Thomas adds to this premise in Man and the Natural World, noting that poultry and game-birds "were often fattened in darkness and confinement, sometimes being blinded as well. 'The cock being gelded,' it was explained, 'he is called a capon and is crammed [force fed] in a coop.' Geese were thought to put on weight if the webs of their feet were nailed to the floor; and it was the custom of some seventeenth-century housewives to cut the legs off living fowl in the belief that it made their flesh more tender. . . . The London poulterers kept thousands of live birds in their cellars and attics. . . . In 1842 Edwin Chadwick found "that fowls were still being reared in town bedrooms."[11]

Eighteenth-and nineteenth-century literature offers additional testimony regarding the treatment of chickens and other domestic fowl. In Tobias Smollett's novel The Expedition of Humphry Clinker, published in 1771, the Welsh traveler Matthew Bramble complains during a visit to London that "the poultry is all rotten, in consequence of a fever, occasioned by the infamous practice of sewing up the

gut, that they may be the sooner fattened in coops, in consequence of this cruel retention."[12] He contrasts the crowded poultry in London with the condition of his own birds in the country "that never knew confinement, but when they were at roost."[13]

In Thomas Hardy's 19th-century novel, Tess of the d'Urbervilles, the principal character works at a poultry farm on a landed estate where the birds—"Hamburghs, Bantams, Cochins, Brahmas, Dorkings, and such other sorts as were in fashion just then"[14]—are crowded into a cottage formally inhabited by generations of families: "The rooms wherein dozens of infants had wailed at their nursing now resounded with the tapping of nascent chicks. Distracted hens in coops occupied spots where formerly stood chairs supporting sedate agriculturalists. The chimney-corner and once blazing hearth was now filled with inverted beehives, in which the hens laid their eggs; while out of doors the plots that each succeeding householder had carefully shaped with his spade were torn by the cocks in wildest fashion."[15]

As is still the practice in small towns throughout the world, chickens and other fowl were taken to market with their legs tied. Tess's father, an improvident alcoholic foot-haggler pretending to earn a living, carries around a live hen who is forced to lie with her legs tied under a bar table while he wiles away the time drinking.[16] Mark Braunstein has described the sale of a chicken that he watched take place in an Italian town, during which the buyer "clutched the chicken by the legs, several times unknowingly and uncaringly banged its head against the ground, weighed it while yanking it to and fro, and finally dumped it into her sack. Then she must have forgotten something, pulled the chicken out again, but only halfway, stuck its legs into the railings of a nearby fence, left it dangling undoubtedly with broken legs and walked away."[17]

In addition to these chronicles there is evidence in history of human regard for chickens, quite apart from economics. Some years ago, I read about a man in South America who cried when the Peace Corps converted his traditional

household flock into a battery hen house. He wept for his hens and the loss of their friendship despite promises that the new "scientific" method of debeaking them and treating them like machines would one day bring him a Cadillac. Eighteenth-century Europeans traveling in South America noted that the Indian women were so fond of their fowl that they would not sell them, much less kill them with their own hands, "So that if a Spaniard . . . offer ever so much money for a fowl, they refuse to part with it."[18]

In Letters from an American Farmer, a study of American Colonial society published in 1782, St. John de Crevecoeur wrote, "I never see an egg brought on my table but I feel penetrated with the wonderful change it would have undergone but for my gluttony; it might have been a gentle, useful hen leading her chickens with a care and vigilance which speaks shame to many women. A cock perhaps, arrayed with the most majestic plumes, tender to its mate, bold, courageous, endowed with an astonishing instinct, with thoughts, with memory, and every distinguishing characteristic of the reason of man."[19]

Molly Ivins tells the story of a Texas woman, Mary Ann Goodnight, who was often left alone on a ranch near the Palo Duro Canyon. "One day in 1877, a cowboy rode into her camp with three chickens in a sack as a present for her. He naturally expected her to cook and eat the fowl, but Goodnight kept them as pets. She wrote in her diary, 'No one can ever know how much company they were.'"[20]

A touching example of human love for a chicken is told by the British humanitarian writer, Henry Salt, concerning an old woman he once met in a roadside cottage in the Lake District, "who had for her companion, sitting in an armchair by the fire, a lame hen, named Tetty, whom she had saved and reared from chicken-hood." A few years later, Salt encountered the woman again, and inquired about Tetty, but learned that she was dead. "Ah, poor Tetty!" the woman said in tears; "she passed away several months ago, quite conscious to the end."[21]

Beginning of the Modern Factory Farm

Chickens were the first farm animals to be permanently confined indoors in large numbers in automated systems based on intensive genetic selection, antibiotics, and drugs. In the 20th century, the poultry industry in the United States became the model for animal agriculture generally throughout the world.[22] In India, where the majority of people are Hindu, a religion that prohibits or discourages the eating of anything that is or has the potential to be animal life, people have been pressured by the United States to adopt intensive poultry production and to consume the unfertilized eggs of hens kept in battery cages.[23]

> Chickens were brought to America by the Europeans: Nearly every boatload of settlers that came to the New World in the 17th and 18th Centuries brought with it at least a few chickens. Chickens were easy to feed and maintain, they supplied eggs and meat on the long voyage, and they became a mainstay of nearly every colonial farm. . . . Surplus meat and eggs, beyond the needs of the family, were disposed of to customers in town or bartered at the country store. Not until after the Revolution was there much interest in poultry production as a commercial enterprise. . . . A wave of optimism for poultry production swept over Eastern enthusiasts shortly after the Civil War. . . . Even so, there was little real progress in commercial poultry husbandry until after 1880.[24]

In the early 19th century, chickens, turkeys, ducks, and geese roamed largely at will, often sharing the farm house with their owners. They foraged in the fields and among the bushes and willows of the brooks and springs, and frequented the Colonial dung hills and ash heaps to obtain the grasses, seeds, sprouts, insects, vitamins and minerals they needed with little or no dependence on home grown grain.[25]

Chickens were raised in towns and villages as well as on farms, and many city people kept them in back lots of various sizes. As late as 1930, the average number of chickens for

the 3 million reporting farms in the United States was twenty-three.[26] At that time, many chickens still seem to have enjoyed a fairly normal life, ranging about the homestead for food during the day, roosting in the trees in the summer and sheltering in the stables and sheds during the winter with the other animals on the farm. Families used the birds for food and sold them and their eggs at the country store and to traveling haulers.

Live chicken haulers "went from farm to farm collecting cockerels [young roosters] and culls [spent, sick and deformed hens] from the laying flock, establishing small feeding stations and assembling a sufficient quantity of birds to haul or ship to the big city markets. . . . The buyer, usually a live poultry broker, would take ownership after the birds were inspected and make arrangements for delivery to other live poultry handlers, city processors, or butcher shops."[27] A common practice was to fake the weight of the birds by such practices as "feeding ingredients to bind the lower intestinal tract followed by feeding salt to encourage heavy water consumption. Poultry was also seeded with gravel or lead shot to increase weight, or fed heavily on a diet of corn just prior to unloading and weighing."[28]

Before the Second World War, women were the primary caretakers of poultry in the United States. Many men felt that it was beneath them to "spend their time fussing with a lot of hens."[29] Mrs. W. B. Morehouse told a Wisconsin Farmer's Institute audience in 1892, "A good many of the masculine gender tell us that it will do very well for women and children but very few men will so lower their dignity as to actually become a poultry keeper."[30] On most farms, the housewife and children looked after the flock, using the money received to buy groceries. Early poultry extension programs were aimed at appealing to farm women. However, as poultry-keeping changed from a small farm project to a major business enterprise, it wasn't long until, as one woman put it, "my" flock became "our" flock and ultimately "his" flock.[31]

Until the 1920s, "broody" hens (true or foster mothers),

and, in some parts of the country surgically caponized (castrated) roosters, were used to rear young chickens in old-fashioned coops. During the 1920s, hatcheries with artificial incubators and brooders became widespread.[32] Poultry husbandry classes and home economics curricula on poultry-keeping gave way to poultry science programs at land grant colleges and universities.[33] In the 1920s, feed companies like Ralston Purina, Quaker Oats, and Larrowe Milling, the forerunner of General Mills, set up poultry research facilities.[34] The founding of Kimber Farms in 1934, in Fremont, California, launched the modern genetics research laboratory focusing on the breeding of chickens for specific economic traits such as heavy egg-laying.[35] Kimber Farms developed a line of vaccines to cope with the chicken diseases that sprang in all directions as a result of genetic hybridization which weakened disease resistance, increasingly crowded conditions, and the proximity of flocks to one another in chicken-producing areas. Today, a proportion of the industry's primary genetic stock is under the subsidiary ownership of pharmaceutical companies.[36]

Since the 1950s, chickens have been divided into two distinct genetic types—broiler chickens for meat production and laying hens for egg production.[37] Battery cages for laying hens—identical units of confinement arranged in rows and tiers—and confinement sheds for broiler chickens came into standard commercial use during the 1940s and 1950s.[38] World War Two, urbanization, and a growing human population produced a demand for cheap, mass-produced poultry and eggs. Following World War Two, many dairy barns were remodeled for meat- and egg-type laying-hen facilities to meet the demand for poultry and eggs that grew during the war when these items were not rationed as was red meat.[39]

By 1950, most cities and many villages had zoning laws restricting or banning the keeping of poultry, a pattern which helped to bring about the decline of the breeding of "fancy" fowl for exhibition in favor of the breeding of "utility" fowl for commercial food production. Poultry diseases

proliferated with the growing concentration of the confined utility flocks that kept getting bigger. In consequence, traditional poultry keeping and poultry shows both came to be viewed as potential disease routes. Largely under the direction of the U.S. Department of Agriculture, an increasingly intricate system of voluntary sanitation, medication, and mass-extermination procedures was established in order to protect the growing industry from succumbing to the problems which the industry itself created.[40]

Following the war, the system known as vertical integration replaced earlier methods of chicken production.[41] Under this system a single company or producer (e.g., Tyson, Perdue) owns all production sectors, including the breeder and commercial flocks, eggs, hatcheries, feed mills and delivery, medications, slaughter and further processing facilities, and delivery to buyers. The producer contracts with small farmers, known as "growers," who supply the land, housing and equipment, look after the chickens, and dispose of the waste: the dead chickens and manure. In this way, a major capital investment, together with the burden of land and water pollution, is shifted to people whom the company can terminate practically at will, and who are often left with mortgages to pay off, scant savings, and little or no legal protection. Despite the contaminated wells and inequities of this system, growers do not like to complain to company inspectors for fear that the company will stop sending them chickens.[42] In 1992, poultry growers in the United States formed a National Contract Poultry Growers Association to campaign for better treatment.[43]

Historically, the chicken industry began in New England, but has preferred to raise and slaughter chickens in the south, where, in addition to the warm weather, there is little or no union activity, a large undereducated rural population, few or no environmental regulations, and a receptive political climate.[44]

Along with better financial security, poultry growers, slaughterhouse workers, and other industry employees would like to be given a sense of dignity by the companies

they work for. They resent being lumped together with the chickens.[45] However, their wish runs counter to the history of the industry, which prides itself on having overcome the general attitude of appreciating individual male and female birds as well as individual farmers. The birds and the workers are not regarded as autonomous living beings with personal worth but as "part of an efficient system of food production."[46]

Behavior

The treatment of chickens for food in modern society is astonishingly ugly and cruel. The mechanized environment, mutilations, starvation procedures, and methodology of mass-murdering birds, euphemistically referred to as "food production," raise many profound and unsettling questions about our society and our species. A former pharmaceutical company employee with the poultry industry wrote afterward that "one of my worst experiences, and it didn't even involve live animals, was the World Poultry Expo in Atlanta. It horrified me because its energy and unquestioned acceptance paralleled a holocaust concentration camp. It was upsetting to see how entrenched economically some very appalling practices are. I would walk through the isles and think, 'I am probably one of the few people here (out of thousands) who find this disturbing'—and I found that very disturbing."[47]

Thus far, our responsibility for how we treat chickens and allow them to be treated in our culture is dismissed with blistering rhetoric designed to silence objection: "How the hell can you compare the feelings of a hen with those of a human being?"[48] One answer is, by looking at her. It does not take special insight or credentials to see that a hen confined in a battery cage is suffering, or to imagine what her feelings must be compared with those of a hen ranging outside in the grass and sunlight. We are told that we humans are capable of knowing just about anything that we want to know—except, ironically, what it feels like to be one of our

victims. We are told we are being "emotional" if we care about a chicken and grieve over a chicken's plight. However, it is not "emotion" that is really under attack, but the vicarious emotions of pity, sympathy, compassion, sorrow, and indignity on behalf of the victim, a fellow creature—emotions that undermine business as usual. By contrast, such "manly" emotions as patriotism, pride, conquest, and mastery are encouraged.

One of the main arguments that is used to dispel opposition to the cruelty imposed on chickens in factory farming is that they are "productive"—e.g., only "happy" hens lay lots of eggs. However, chickens do not gain weight and lay eggs in inimical surroundings because they are comfortable, content, or well-cared for, but because they are specifically manipulated to do these things through genetics and management techniques that have nothing to do with happiness, except to destroy it. In addition, chickens in production agriculture are slaughtered at extremely young ages, before diseases and death have decimated the flocks as they would otherwise do, even with all the medications.

Notwithstanding, millions of young chickens die each year before going to slaughter, and on the way to slaughter, but because the volume of birds is so big—in the billions—the losses are economically negligible. Many more birds suffer and die under factory farming than in traditional farming; however, more pounds of flesh and eggs are realized under it, also. The term "productivity" is an economic measure referring to averages, not the well-being of individuals. Excess fertility and musculature are not the criteria that we use to judge the well-being of human individuals and nations, and they are not indices of avian well-being, either. In both cases, they more likely signify the opposite.

Chickens are not suited to the captivity that is imposed on them in order to satisfy human wants in the modern world. Michael W. Fox states that chickens and other factory farm animals may sometimes appear to be adapted to the intensive conditions under which they are kept, "but on the basis of their functional and structural 'breakdown,' which is

expressed in the form of various production diseases, they are clearly not adapted."[49]

Barbara Noske has noted that there is no compelling reason why nonhuman animals should not be regarded with humans as "total beings whose relations with their physical and social environment are of vital importance."[50] The morality of forcing human beings to subsist in alien environments to serve economic objectives was analyzed by Karl Marx in terms that provide insight into the experience of chickens shunted into human-created environments that are alien to their nature. Marx described four interrelated aspects of alienation: from the product, from the productive activity, from the species life, and from fellow humans. We can look at chickens (and other nonhuman animals) from a similar viewpoint.

Factory chickens are alienated from their own products, which consist of their eggs, their chicks, and parts of their own bodies. The eggs of chickens used for breeding are taken away to be artificially incubated and hatched in mechanized hatcheries, and those of caged laying hens roll onto a conveyer belt out of sight. Parents and progeny are severed from one another. Factory chickens live and die without ever knowing a mother. The relationship between the chicken and his or her own body is perverted and degraded by factory farming. An example is the cruel conflict in young broiler chickens between their abnormally rapid accumulation of breast muscle tissue and a developing young skeleton that cannot cope with the weight, resulting in crippling, painful hip joint degeneration and other afflictions that prevent the bird from walking normally, and often, or finally, from walking at all. Human sufferers can obtain pain relief medication; the chickens have no such options.

Chickens are alienated from their own productive activity, which is reduced to the single biological function of either laying eggs or gaining weight at the expense of the whole bird. Normal species activity is prevented so that food (energy) will be converted into this particular function only and not be "wasted." The exercise of the chicken's natural

repertoire of interests and behavior conflicts fundamentally with the goals of factory farming.

Chickens are alienated from their own societies. Their species life is distorted by crowding and caging, by separation of parents and offspring, by the huge numbers of birds crowded into a vast confinement area (somewhat as if one were compelled to live one's entire life at a rock concert or political rally—after the show was over), and by the lack of natural contact with other age groups and sexes within the species. Chickens should be living in small groups that spend their day foraging for food, socializing and being active; thus, the egg industry will cynically tell you that one of the advantages of the battery cage is that it satisfies the chicken's need to be part of a little flock.[51]

In the most encompassing sense, factory farm chickens are alienated from surrounding nature, from an external world which answers intelligibly to their inner world. There is nothing for them to do or see or look forward to; no voluntary actions are permitted, or joy or zest of living. They just have to be, in an existential void, until we kill them. The deterioration of mental and physical alertness that occurs under these circumstances has been suggested by some farm animal scientists as an adaptive mechanism prohibiting the occurrence of long-term suffering. F. Wemelsfelder states more reasonably, "It would be conceptually meaningless to assume that such states could in any way come to be experienced by an animal as 'normal' or 'adapted.' Behavioural flexibility represents the very capacity to achieve well-being or adaptation; impairment of such capacity presumably leaves an animal in a helpless state of continuous suffering."[52]

Lesley J. Rogers, an avian physiologist specializing in the chicken, points out that chickens in battery cages not only suffer from restricted movement, but "They have no opportunity to search for food and, if they are fed on powdered food [which they are], they have no opportunity to decide at which grains to peck. These are just some examples of the impoverishment of their environment. . . . Chickens experi-

encing such environmental conditions attempt to find ways to cope with them. Their behavioral repertoire becomes directed towards self or cage mates and takes on abnormal patterns, such as feather pecking or other stereotyped behaviors . . . used as indicators of stress in caged animals."[53]

I've seen signs of this kind of stress in our household chickens. In addition to their other expressive languages, chickens have a piping voice of woe and dreariness whenever they are bored or at a loose end. Occasionally, one of our hens has to be kept indoors for a while, because she is recovering from an illness or because she is a new hen who has not yet joined the flock outside. Wearily, she will wander about the rooms, fretting, and sometimes biting at my ankles, or tag disconsolately and beseechingly behind me, yawning and moaning like a soul in the last stages of ennui.

Reactions to the "Animal Machine"

Some critics have argued that the revulsion we feel at how chickens and other animals are treated for food is not necessarily moral but perhaps only aesthetic. The "animal machine" offends our aesthetic consciousness. Thus J. Baird Callicott argues: "The very presence of animals, so emblematic of delicate, complex organic tissue, surrounded by machines, connected to machines, penetrated by machines in research laboratories or crowded together in space-age 'production facilities' is surely the more real and visceral source of our outrage at vivisection and factory farming than the contemplation of the quantity of pain that these unfortunate beings experience."[54] In this view, we do not identify with the animals or with their pain, or burden our thoughts with the misery of their lives at our hands. Rather, our reactions are produced by something more abstractly incongruous of which the situation including the animal is "emblematic." Robert Burruss writes somewhat more searchingly:

> About 20 years ago, Scientific American ran an article on the management of chickens in the production of eggs and meat. Concentration camps for chickens is

what one friend who read the article called the chicken farms.

My enjoyment of eggs and chicken has forever been abridged by that article. . . . [T]he problem is not moral; rather it is . . . the images evoked by the idea of scrambled eggs or chicken meat, images from the article of the ways the animals spend their bleak lives.

Maybe, thinking about it now as I write this, those images actually are a basis of a moral judgment. Maybe that's how moral judgment originates.[55]

Maybe.

Not long ago, a friend of mine was driving one afternoon down a back road on the Eastern Shore of Maryland when she came upon a chicken house, which she described as "in the middle of nowhere." She stopped the car, got out, walked over, unlatched the door, and tiptoed inside. There was the usual scene, thousands of young chickens, amid the ammonia haze, with the mechanical feeders and drinkers. Over in a corner, she noticed that some kind of exciting activity was taking place, and making her way over carefully she saw that the birds in the immediate vicinity had either found, or else they had made, a hole in the ground through which they were crawling in and out to dustbathe.

Outside, around back, she watched the scene. She watched the young chickens as they threw up their little clouds of dust against the big sky, and the flat fields, and the long low building with a sign that said, very simply, "There is no one here, but us chickens."[56]

No. There was a witness. And, through her eyes, I too became a witness to their lives.

Chapter 2
The Birth and Family Life of Chickens

> Then they all settled down in the soft green shade of the lemon tree, with each little chick taking its turn to fly up to the best and softest seat on Granny Black's back. And while they waited for the sun to go down again, she told them about the great big world outside the chick run, or the days when she was a chick, or the story she liked telling best of all—her Miracle story about Eggs. How the broken fragments they had hatched from were once smooth, complete shapes: how every chicken that ever was had hatched out in exactly the same way; how only chooks* could lay such beauties; and how every time they did, they were so filled with joy that they could not stay quiet, but had to burst into song; and how their song was taken up by England the cock and echoed by every single hen in the Run
>
> Mary Gage, Praise the Egg[1]

When Living Creatures Become "Units"

The birth of a chicken is a poignant event. In The Chicken Book, Page Smith and Charles Daniel write: "As each chick emerges from its shell in the dark cave of feathers underneath its mother, it lies for a time like any newborn creature, exhausted, naked, and extremely vulnerable. And as the mother may be taken as the epitome of motherhood, so the newborn chick may be taken as an archetypal representative of babies of all species, human and animal alike, just brought into the world."[2]

Most of us know deep inside that we are members of a single family of living creatures, yet many people resist this knowledge and its implications. Evolution is accepted, but the sentiment of kinship still struggles to evolve. A few years

*The Australian word for chickens is "chooks."

ago, I was reproved by a former meat inspector for issuing a news release that in his view ignored "hard science" and sentimentalized chickens in order to win sympathy for their plight.[3] I had stated that "For a chicken trapped inside the world of modern food manufacture, to break out of the shell is to enter a deeper darkness full of bewildering pain and suffering from birth to death."[4] I noted that a mother hen will tenderly and even fiercely protect her young brood, driving off predators and sheltering her little chicks beneath her wings, and that roosters often join in the hen's egg-laying ritual, which is an extremely important and private part of a chicken's life.

While dismissing these statements as "unscientific," the writer acknowledged the justness of my and others' descriptions of the "visceral horrors of an ordinary day at the slaughterhouse, where humans and birds are often treated in inhumane ways."[5] Especially disturbing was the treatment of male chicks by the egg industry who on hatching are thrown into trash cans to suffocate.

Clearly a struggle is taking place here between recognition of the link between chickens and humans—which alone would explain why both groups could be judged as inhumanely treated by the poultry industry—and the dogma that chickens (and virtually all other nonhuman creatures) do not have experiences comparable to human experience. Manifest similarities between their behavior and ours, as in the parental care and protection of offspring, are dismissed as "mere instinct" in them, even though human behavior is similarly grounded in the instinctual impulses and corresponding patterns of emotion that characterize our own species and bind our species to others.

Observations of natural incubation have shown that a hen turns each egg as often as thirty times a day, using her body, her feet, and her beak to move her eggs in order to maintain the proper temperature, moisture, ventilation, humidity, and position of the egg during the 21-day incubation period.[6] Though new to the west, artificial incubation of poultry eggs has been practiced for over two thousand years

in Egypt, China, and other eastern countries.[7]

The automated poultry slaughtering technology that developed in the 1940s and 1950s followed the development of mechanical incubators at the turn of the century.[8] Mechanical incubators, which can now hold from 68,000 to 110,000 eggs at once,[9] enabled a farmer to start with 100 or more baby chicks without requiring a hen to sit on a nest and hatch the chicks. The development of huge hatcheries to brood the chicks dispensed with her warmth and nurturing, as well. Henceforth, the hen would be either a "breeder" or a "layer," instead of a mother.

School Hatching Projects

Not surprisingly, few people today perceive chickens as even having a mother, let alone a father. The school hatching programs that began in the 1950s mislead children to think that chickens come from mechanical incubators.[10] Supplemental facts about the role of the rooster and the hen, even if provided, cannot compete with the mechanized classroom experience. Every year, kindergarten and elementary school teachers and their students place thousands of fertilized eggs in classroom incubators to be hatched within three or four weeks. In 1994 one egg supplier sold 1,800 eggs to New York City schools alone.[11]

These birds are not only deprived of a mother; many grow sick and deformed because their exacting needs are not met during incubation and after hatching. Chick organs stick to the sides of the shells because they are not rotated properly. Chicks are born with their intestines outside their bodies. Eggs hatch on weekends when no one is in school to care for the chicks. The heat may be turned off for the weekend causing the chicks to become crippled or die in the shell.[12] Some teachers even remove an egg from the incubator every other day and open it up to look at the chick in various stages of development, thus adding killing of innocent life to the child's education.[13]

When the project is over, the unwanted survivors are a

problem to be disposed of. Because a child bonds naturally with infant animals, students and even some teachers are misled to believe that the chicks are going to live out their lives happily on a farm, when in reality, most of them are going to be killed immediately (working farms do not assimilate school-project birds into their existing flocks for fear of disease), sold to live poultry markets and auctions, fed to captive zoo animals, or left to die slowly of hunger and thirst as a result of ignorance and neglect.[14] Increasing urbanization and zoning laws enormously compound the problem. Residential zoning bans the keeping of domestic fowl, while even people who can provide a good home for a chicken can accommodate only so many roosters. Normal flocks have several female birds to one male, roosters crow before dawn, and some will attack people. Unfortunately, half of all chickens born are males.[15]

Chick hatching projects teach children (and teachers) that bringing a life into the world is not a grave and permanent responsibility with ultimate consequences for the life thus created. Children's public television has contributed to this desensitivity and to the fallacy that chickens have no natural origin or need for a family life. The *Reading Rainbow* program, "Chickens Aren't The Only Ones," based on a book by Ruth Heller, shows that there are other kinds of animals besides chickens that lay eggs.[16] However, chickens are the "only ones" depicted only in barren surroundings. One heartless scene shows a baby chick struggling out of its egg alone on a bare table, while ugly, insensitive music blares, "I'm breaking out." The 3-2-1 Contact program, "Chickens and Pigs," is shameless propaganda posing as education.[17] Promoting the agribusiness theme of "changing nature to get the food we eat," it contains hatchery footage of newborn chicks being hurled down stainless steel conveyers, tumbling in revolving sexing carousels, being flung down dark holes, and brutally handled by chicken sexers who grab them, toss them, and hold them by one wing while casually asserting that none of this hurts them at all. These scenes are interjected with rapid sequence images of mass-produced

fruits and vegetables. Children are told that "farmers are changing how we grow 100 million baby chicks a week, 3 million pounds of tomatoes, 36 billion pounds of potatoes." Chickens are described as a "monocrop" suited to the "conveyor belt and assembly line, as in a factory."

Is it any wonder that many people in our society regard a chicken as some sort of weird chimerical concoction comprising a vegetable and a machine?

The Egg and Chick: Historical Symbols of Nature and Rebirth

This perception is new. Notwithstanding the 17th-century Cartesian model of animals as machines,[18] throughout history the chick and the egg have symbolized the mystery of birth and renewal of life. The Italian Renaissance ornithologist, Ulisse Aldrovandi, wrote in regard to the use of eggs in religious ceremonies that "Eggs were believed to reproduce all nature and to have a greater power for placation in religion and for prevailing upon the powers of heaven."[19] The Hindus saw the beginning of the world as an enormous cosmic egg that incubated for a year and then split open, half silver and half gold. "The silver half became the earth; the gold, the sky; the outer membrane, mountains; the inner, mist and clouds; the veins were rivers, and the fluid part of the egg was the ocean, and from all of these came in turn the sun."[20] In Plato's Symposium, Socrates explains love by telling how the gods split human beings into two halves—like halves of an egg—so that each half seeks its complement throughout life.[21]

Christianity adopted the egg as a symbol of Christian rebirth. The eggshell symbolized the tomb from which Christ had risen and the inner content of the egg symbolized the theme of resurrection and hope for eternal life.[22] The egg was a traditional feature in many ancient rites of spring. The word "Easter" comes from "the name of the Anglo-Saxon goddess of spring, Eoestre, whose festival was on the first Sunday after the full moon following the vernal equinox."

Eoestre is depicted in an ancient Anglo-Saxon statue holding an egg, the symbol of life, in her hand.[23]

Easter Egg Hunt and Egg Gathering

The association of the hen's egg with Easter and spring survives ironically in the annual children's Easter Egg Hunt, for the origin of this ritual has been largely forgotten.

Traditionally, the finding of eggs was identified with the finding of riches. The search for eggs was a normal part of farm life, because a free hen sensibly lays her eggs in a sheltered and secluded spot. However, today's children hunt for eggs that were laid by a hen imprisoned in a wire cage in a mechanized building. The widespread disappearance of the home chicken flock in the 1950s ended the gathering of eggs laid by a hen in the place which she chose for her nest. Page Smith writes: "My contemporaries who have such dismal memories of chickens from the unpleasant chores of their youth had experienced already the consequences of putting living creatures in circumstances that are inherently uncongenial to them."[24]

Wilbor Wilson explains that "As the size of poultry ranches increased, the chore of egg gathering became drudgery instead of pleasure. Rollaway nests with sloping floors made of hardware cloth offered a partial solution, but the number of floor eggs increased when the hens did not readily adopt the wire-floored nests. This changed with development of the cage system which incorporated the roll out feature and left the hen no choice."[25]

The Hen as a Symbol of Motherhood

> "[T]he continued emphasis genetically [has been] on smaller, more efficient but lighter-weight egg machines."[26]

In our day, the hen has been degraded to an "egg machine." In previous eras she embodied the essence of motherhood. The First Century A.D. Roman historian and

biographer Plutarch wrote praisingly of the mother hen in De amore parentis: "What of the hens whom we observe each day at home, with what care and assiduity they govern and guard their chicks? Some let down their wings for the chicks to come under; others arch their backs for them to climb upon; there is no part of their bodies with which they do not wish to cherish their chicks if they can, nor do they do this without a joy and alacrity which they seem to exhibit by the sound of their voices."[27]

In Christian theology, the mother hen expresses the spirit of yearning and protective love, as in Christ's lament:

"Jerusalem, Jerusalem, how often have I wished to gather your children together, as a hen gathers her chicks, and you did not wish it."[28]

Aldrovandi wrote of mother hens in the 16th century: "They follow their chicks with such great love that, if they see or spy at a distance any harmful animal, such as a kite or a weasel or someone even larger stalking their little ones, the hens first gather them under the shadow of their wings, and with this covering they put up such a very fierce defense—striking fear into their opponent in the midst of a frightful clamor, using both wings and beak—they would rather die for their chicks than seek safety in flight. . . . Thus they present a noble example in love of their offspring, as also when they feed them, offering the food they have collected and neglecting their own hunger."[29]

Maternal Instincts in the Domestic Hen

While the egg industry claims that the modern "egg machine" has had the broodiness bred out of her, it is more likely that the hen's mothering impulses have been suppressed rather than eliminated. Jennifer Raymond wrote of her surprise on purchasing a hen by mail order:

> Another benefit of the White Leghorn, according to the Sears Catalogue, is that the maternal instinct has been bred out of the hens so they don't "go broody." Going broody is the notion hens get to sit on eggs

and raise a family. During this time, hens stop laying. Needless to say, this tendency has no commercial value. One of my hens seemed to be a throwback, however, and began spending all her time in the hen house, sitting on the nest.

Since I had no rooster, the eggs weren't fertile and her efforts would have proven futile had I not procured some fertile eggs from my neighbors and placed them in the nesting box. Nineteen days later, I woke to see her out in the yard followed by five little red balls of fluff. She was an attentive mother, teaching the chicks to scratch, and all the best places to look for food. Soon the chicks were as large as their "mother," but they still gathered underneath her at night. It was so comical to see these large, gawky adolescent youngsters sticking out on all sides of the little white hen.[30]

Scientists have recorded the revival of maternal expression in feral hens. (The term "feral" refers to domesticated animals who return to a self-sustaining way of life.) Like their ancestors and contemporary relatives in the tropical forests, the feral chickens formed "small, discrete social groups which spent much of their day foraging either separately or together, then returning at dusk to roost. The hens concealed their nests and raised and defended their broods." Nicol and Dawkins summarize, "[T]here is no evidence that genetic selection for egg laying has eliminated the birds' potential to perform a wide variety of behaviour."[31]

The Role of the Rooster

The family role of the rooster is even less well known than the motherhood of the hen. The charm of seeing a rooster with his hens appears in Chaucer's portrait of Chanticleer:

This cock had in his princely sway and measure
Seven hens to satisfy his every pleasure,
Who were his sisters and his sweethearts true,
Each wonderfully like him in her hue

Of whom the fairest-feathered throat to see
Was fair Dame Pertelote. Courteous was she,
Discreet, and always acted debonairly.[32]

In ancient times the rooster was esteemed for his sexual vigor. (It is said that a healthy young cock may mate as often as thirty times a day.)[33] According to *The Chicken Book*, "The extreme erectness of the cock, straining upward, has suggested to many besides the Greeks the erectness of a tumid penis."[34] He thus figures in religious history as a symbol of divine fertility and the life force. In his own world of chickendom, the rooster—the cock—is a lover, a father, a brother, a food-finder, a guardian, and a sentinel.

Aldrovandi extolled the rooster's domestic virtues: "He . . . is for us the example of the best and truest father of a family. For he not only presents himself as a vigilant guardian of his little ones, and in the morning, at the proper time, invites us to our daily labor; but he sallies forth as the first, not only with his crowing, by which he shows what must be done, but he sweeps everything, explores and spies out everything." Finding food, "he calls both hens and chicks together to eat it while he stands like a father and host at a banquet . . . inviting them to the feast, exercised by a single care, that they should have something to eat. Meanwhile he scurries about to find something nearby, and when he has found it, he calls his family again in a loud voice. They run to the spot. He stretches himself up, looks around for any danger that may be near, runs about the entire poultry yard, here and there plucking up a grain or two for himself without ceasing to invite the others to follow him."[35]

A 19th-century poultry keeper wrote to his friend that his Shanghai cock was "very attentive to his Hens, and exercises a most fatherly care over the Chicks in his yard. . . . He frequently would allow them to perch on his back, and in this manner carry them into the house, and then up the chicken ladder."[36]

Why Roosters Crow

The thing most people identify with roosters is crowing. Why do roosters crow? Remember that chickens are originally from the jungle. Their wild relatives have lived in tropical forests for tens of thousands of years. Perched in the trees, and sensitive to infrared light, chickens see morning light at least forty-five minutes before we do.[37] They also have very keen ears, a distinct advantage when living amid dense foliage.[38] It can be difficult to see a predator and keep track of one's flock when the sub-flocks are constantly moving from place to place while feeding.

Through their crowing, every rooster knows where every other rooster is at all times. Each rooster can recognize the crow of at least thirty other roosters, probably more.[39] As protectors of the flock, roosters are always on the lookout. If a rooster spots danger, he sends up a shrill cry. The other roosters echo the cry. Thereupon, the whole flock will often start up a loud, incessant, drum-beating chorus with all members facing the direction of the first alarm, or scattering for cover in the opposite direction.

When it looks safe again, an "all clear?" query goes out from the rooster, first one, followed by the others, in their various new places. Eventually, the "all clear" crow is sent up by the bird who first raised the alarm, and a series of locator crows confirms where every other rooster and his subflock are at this point.[40]

Relationship Between the Rooster and the Hen

Mating and nesting elicit other kinds of vocal communication within the flock.[41] When a hen is ready to lay an egg, she gives a nesting call, inviting her mate to join her in finding a nest site. Together, the hen and rooster find and create a nest by pulling and flinging around themselves twigs, feathers, hay, leaves and loose dirt, after they have scraped a depression with their beaks and feet.[42] But first comes the search.

When the rooster finds a place he likes (under a log, per-

haps), he settles into it and rocks from side to side, while turning in a slow circle and uttering primeval grumbling growls which may or may not convince the hen that this is the place. She may accept it, or they may look for another site. During and after the search, the hen cackles and squawks to keep the rooster coming back to her while she is away from the protection of the flock.[43]

Often I have heard one of our hens call out to her rooster partner: "I'm all alone. Get over here!" Our normally quiet hen, Petal, raised a ruckus if her adored Jules was out of her sight for long, even if she had not just laid an egg. Her otherwise demure little voice became SQUAWK, SQUAWK, SQUAWK. Jules lifted his head up, straightened up, muttered to himself in what can only be described as Chicken Talk, and did an about-face. Off he went to comfort Petal. Silence.

Each of our "broiler" roosters, Henry and Phoenix, stood by his favorite hen while she laid her egg. I've even seen the whole flock gather around a nesting hen in our chicken house for half an hour or more until she laid her egg. Once when I was in the car with Phoenix, a man ran over to us in the parking lot, and said, "When I was a young man I worked on a chicken farm, and do you know, one of the most amazing things about those chickens was that they would actually choose each other and refuse to mate with any one else."

Though chickens are polygamous, mating with more than one member of the opposite sex, individual birds are attracted to one another. They not only "breed"; they form bonds, "always sharing their goodies and clucking endearments to one another throughout the day."[44] A rooster does a dance for his special hens in which he "skitters sideways and opens his wing feathers downward like Japanese fans—the chicken version of the strut that is found in many bird species."[45]

Bravery of Chickens

The call of the wild is in the chicken's heart, too. Far from being "chicken," roosters and hens are legendary for bravery.[46] In classical times, the bearing of the cock symbolized military valor: his crest stood for the soldier's helmet, his spurs stood for the sword.[47] A chicken will stand up to an adult human being. Our tiny bantam rooster, Bantu, flashes out of the bushes and repeatedly attacks our legs, his body tense, his eyes riveted on our shins lest we should threaten his beloved hens! An annoyed hen will confront a pesky young rooster with her hackles raised, and run him off! Although chickens will fight fiercely and successfully with foxes and eagles to protect their family, with humans such bravery usually does not win. A woman employed on a breeder farm in Maryland wrote a letter to the newspaper berating the defenders of chickens for trying to make her lose her job, threatening her ability to support herself and her daughter.[48]

For her, "breeder" hens are "mean" birds who "peck your arm when you are trying to collect the eggs." In her defense of her life and her daughter's life against the champions of chickens, she failed to see the comparison between her motherly protection of her child and the exploited hen's courageous effort to protect her own offspring.

In an outdoor flock, ritual, and frequently playful, sparring or chasing normally suffices to maintain order without actual bloodshed. Chickens have a natural sense of order and learn quickly from each other. An exasperated bird will either move away from the offender or else aim a peck, or a pecking gesture, that sends a message—"lay off!" Bloody battles, as when a new bird is introduced into an established flock, are rare, short-lived, and usually affect the comb.[49] It is when chickens are crowded, confined, bored, or forced to compete at a feeder that distempered behavior can erupt. However, chickens allowed to grow up in successive generations unconfined do not evince a rigid "pecking order."[50] Parents oversee the young, and the young contend playful-

ly, among many other activities. A small flock composed of well-acquainted adults is an amiable social group. Sometimes chickens run away; however, fleeing from a bully or hereditary predator-species on legs designed for the purpose does not constitute cowardice.

Formation and Laying of the Egg

A nesting hen is a comforting sight, as shown by the frequency of this image in decorative art. However, the setting hen is not idle. She turns her eggs many times a day and keeps her nest fresh and clean. If an egg rolls away she pulls it back under her with her beak. In addition, she leaves the nest for ten to twenty minutes each day to forage for food, drink water, defecate, and stretch her wings. Artificially incubated eggs must be cooled for fifteen to twenty minutes a day to match the time the hen is away from her nest.[51]

A rooster is not required for a hen to lay eggs. Eggs are periodically shed from her body the same as in other vertebrate females. However, the avian female has but one mature ovary, the left, and it is large in relation to the rest of her body compared with the ovaries of a mammal. In addition, it is surrounded by the yolk, albumin, shell membranes, shell, and cuticle necessary to nourish and protect the life of an embryo developing outside the mother. The egg is the female component of the species germline and is therefore present in some form at all stages. As noted in The Chicken Book, "even when the chick is in the egg there are eggs within the chick, microscopically small but full of potential."[52]

Of the thousands of ova, only a small number actually mature to be laid, fertile or otherwise. A hen lays a group of eggs, one egg a day, in an indeterminate sequence of three to fifteen eggs at the same time, called a clutch. The eggs of the sequence are often laid a little later each day, starting in the early morning an hour or two after sunrise; thus an egg laid late in the afternoon would signal the end of a sequence.[53] Then the hen skips a day or more of ovulation and egg laying before starting another clutch. If the eggs are fertile, she

waits to incubate (sit on) them until the last egg of the clutch is laid, thus ensuring that all the eggs start to develop and hatch at the same time.[54]

Like the egg of a mammal, a hen's egg consists of a tiny reproductive cell, called a blastoderm, from which the embryo develops.[55] In the chicken, it is surrounded by the embryo's food, or yolk, and subsequent overlays. It takes about ten days for an individual yolk to mature. This is followed by ovulation, at which time the mature yolk bursts from the ovary to be seized and engulfed by the funnel-shaped opening to the oviduct, called the infundibulum, which partially surrounds the ovary. Fleshly projections from the oviduct fill with blood, and the walls of the oviduct writhe and contract, moving the rotating egg into the portion of the oviduct known as the magnum. Here it receives the white, or albumin, the first layer of which becomes twisted at each end in opposite directions. These twisted ends, called the chalazae, polarize the egg and centralize the yolk after the egg is laid.

After two or three hours in the magnum, the egg goes to the isthmus to acquire the thin inner and thick outer shell membranes, composed of tough protein fibers, that prevent bacteria and other organisms from entering the egg. These membranes are in contact everywhere except at the large end of the egg, at the point where the air cell appears soon after the egg is laid.

After about an hour in the isthmus, the egg travels to the shell gland, or uterus, where it remains for 18 to 20 hours. Here, water and salts penetrate the shell membranes by osmosis, and the egg is kneaded by the muscular rhythms of the uterus into its final shape as the calcium salts are deposited. There are two layers, an inner shell composed of sponge-like calcite crystals, and an outer shell composed of hard, chalky calcite crystals about twice as thick as the inner shell crystals. The outer shell contains the brown, blue, green, or speckled color. Otherwise the shell is white. Color is based on molecular pigments, called the porphyrins, produced in the uterus when the shell is produced.

It takes between 23 and 26 hours for the egg to traverse the oviduct, including the vagina where the cuticle is deposited, to be laid. If no sperm are present, either in the infundibulum or in the short, tubular projections in the lower portions of the oviduct, the egg will be infertile. Once the outer layers of white and shell surround the yolk, the sperm are mechanically barred from entering the ovum. Sperm may be stored in the hen for up to four weeks for fertilization.[56]

The actual laying of the egg is a complex process involving nervous signals from the brain to the muscles of the uterus and vagina, and the influence of hormones released from the posterior pituitary gland. Just as prolactin and other hormones that initiate maternal behavior are the same in both mammals and birds, so the hormones that stimulate muscular contractions in birds are the same ones that stimulate the uterine contractions in mammals leading to birth.[57]

Normally, the egg is in the hen's vagina for a few minutes, though it may reside there for several hours if necessary. The egg moves through the oviduct small end first, but just before oviposition it rotates horizontally in order to be laid with the large end first. This enables the uterine muscles to exert greater pressure on more surface area as the egg is being expelled. Finally, "in what is so obviously for the hen a moment full of pride and satisfaction, the egg, magnificently completed, is laid."[58]

If pride and satisfaction are an important part of egg laying in chickens, then the following description of the caged hen's ordeal may be cited in contrast.

> The frightened battery hen starts to panic as she vainly searches for privacy and a suitable nesting place in the crowded but bare wire cage; then she appears to become oblivious to her surroundings, struggling against the cage as though trying to escape. . . .
>
> Take a moment to imagine yourself as a layer chicken; your home is a crowded cage with a wire floor that causes your feet to hurt and become deformed; there's no room to stretch your legs or flap

> your wings and they become weak from lack of exercise; but at the same time, you can never be still because there is always one of your miserable cell mates who needs to move about; one of the other chickens is always picking on you and you cannot get away—except by letting others sit on top of you; the air is filled with dust and flying feathers that stick to the sides of the cage splattered with chicken shit from the inmates in the cage upstairs; it is hard to breathe—there is the choking stench of ammonia in the air from the piles of manure under the cages and you don't feel at all well; the flies are unbearable despite the insecticide sprayed in the air and laced in your food—to kill the fly larvae before they mature; the food—never green and fresh—seldom varies and tastes always of the chemical additives and drugs needed to keep you alive; eventually, despite your wretchedness and anguish, and the tormented din of thousands of birds shrieking their pain together, you lay an egg and watch it roll out of sight; but the joy of making a nest, of giving birth, of clucking to your chicks is absent—laying the egg is an empty, frustrating, and exhausting ritual.[59]

Most of the eggs sold for human consumption are infertile. Battery hens do not have contact with cockerels except for those missed at the hatchery. The male chicks are trashed—a quarter of a billion birds born each year in the United States—representing half the population of egg-industry hatchlings.[60] They can't lay eggs or compete with broiler chickens for muscle tissue; hence "the sex is terminal."[61] Male chicks who escape the chicken sexers, and are not subsequently culled in the pullet house, can end up caged with the hens. On our tour of a caged layer facility in Maryland, two or three crows rose amid the cries of thousands of hens.[62]

Embryonic Development and Hatching of the Chick[63]

If the egg is fertile, then a chick is beginning to grow inside, having already developed by the time it is laid from a one-celled individual, or zygote, to an embryo composed of approximately 60,000 cells through geometric cellular division. Total incubation takes twenty-two days, including one day inside the hen. While still in her body, the reproductive cell, the blastoderm, forms into two layers, an upper layer of cells called the ectoderm and a lower layer of cells called the entoderm. Soon, the middle layer, or mesoderm, forms. The entire body of the bird arises from these three layers. From the ectoderm come the nervous system, parts of the eyes, the feathers, beak, claws, and skin. From the entoderm come the respiratory and secretory organs and the digestive tract. From the mesoderm come the skeleton, muscles, blood system, reproductive organs, and excretory system.[64]

The mammalian embryo develops inside the mother from nutrients derived from her blood supply. The avian embryo develops outside the mother from nutrients that were made or received by her body and stored in the egg. Certain membranes make these nutrients available to the growing chick. The yolk sac that envelops the yolk secretes an enzyme that changes the yolk into a digestible form. Just before hatching, the yolk sac is drawn into the chick's body to serve as a food supply for the first few days after hatching.[65] The allantois, which completely surrounds the embryo by the ninth day, oxygenates the blood and removes carbon dioxide, removes excretions to a special cavity, and aids in the digestion of albumen and the absorption of calcium from the eggshell. The chorion fuses the allantois with the inner shell membrane to facilitate these functions.[66] On the twelfth day the embryo begins to imbibe the amniotic fluid, which may contain chemicals that stimulate the development of taste and smell.[67]

A major challenge of incubation is the conservation of fluids and the preservation of the chick from harm, while

allowing for the diffusion of oxygen into the egg and the release of carbon dioxide and moisture into the atmosphere. This challenge is met by the existence of thousands of tiny pores in the shell, backed up by cuticle that stretches across the pores to hinder evaporation and prevent bacteria from entering the shell. Organisms that manage to get through face disruption by the antibacterial protein, lysozyme, in the albumin.[68]

The hen donates parental immunity to the developing embryo. Antibodies produced by her body in response to pathogens in the immediate environment pass into the egg to be incorporated into the blood of the chick. When the hen and her chicks share the same environment, the unborn chick is thus protected from the very bacteria, viruses, and fungi that are most likely to cause trouble. However, parental immunity wears off soon after the chick hatches. Half is lost in the first three days. By the end of the fourth week, it disappears.[69] Under ordinary circumstances, this is no problem, for by then the chick has developed an active immune system, aided by a rich intestinal microflora, that destroys and repels harmful invaders.[70]

Maternal Immunity Disrupted By Factory Farming: Marek's Disease, Infectious Bursal Disease

Even under conditions in which an organism and its environment are in harmony, diseases will sometimes occur. Normally, an organism's natural defense system holds diseases in check. However, factory farming, with its inherent filth, has produced specific diseases that penetrate parental immunity and disrupt the developing immune system in the young chick by attacking the two lymph glands in which immunity originates, the thymus (T-system) and bursa of Fabricius (B-system). Impairment of these glands disrupts the production of antibodies, reducing or eliminating the bird's ability to resist secondary infections such as Salmonella and E. coli. Two examples are Marek's disease and infectious bursal disease.[71]

Marek's disease is an infectious immunosuppressive cancer that fills the chicken's spinal chord and peripheral nervous system with malignant tumors, resulting in paralysis, blindness, and death. It is caused by an airborne herpesvirus that localizes in the feather follicles and is sloughed through the dander and feather particles to float in the air and be inhaled by the birds in the dirty, crowded environments in which even their feathers are fatal. It suppresses and destroys the chicken's thymus. According to Hunton, Marek's disease vaccines "appear to work by preventing development of signs of Marek's disease. However, they apparently do not prevent infection of the hosts with Marek's disease virus: virus can be recovered from almost any commercial chickens tested."[72] A 1996 article in Broiler Industry states, "Marek's disease condemnations and mortality are on the rise, increasing with each passing year during the 1990s."[73]

Infectious bursal disease, also known as Gumboro because the first outbreaks occurred near Gumboro, Delaware, in 1957,[74] is "an acute, highly contagious viral infection of young chickens that has lymphoid tissue as its primary target with a special predilection for the bursa of Fabricius."[75] There, it destroys the immune cells responsible for most of the antibodies in the young chicks, making them vulnerable to everything from skin disease to hepatitis-anemia to E. coli infections. Afflicted birds develop severe liver and kidney disease and are listless, nervous, sleepy, dehydrated, and have a whitish diarrhea. Their irritated vents cause the birds to pick. Filthy houses and equipment promote the infection.[76]

Inside the Egg

Meanwhile, a tiny being is growing inside the egg, whether nestled beneath the mother or crammed in an incubator hatcher among thousands of other embryos. During the first 24 hours after the egg is laid the tiny heart starts beating and blood vessels begin to form, joining the embryo and the yoke

sac. Other body parts originate during this time, including the alimentary tract, spinal column, nervous system, head and eyes. On the third day, the embryo begins to rotate to lie on its left side. By the fourth day, all of the body organs are present, with the nose, legs, wings, and tongue taking shape and the vascular system in place. On the fifth day, the reproductive organs differentiate and the face begins to assume a lifelike appearance. On the sixth day, the beak and the eggtooth (which protects the beak and also helps crack the shell) can be seen along with some voluntary movement of the embryo.[77]

During the next seven days, the body develops rapidly, including the formation of the abdomen and intestines. Feather germs, the origin of feather tracts, appear, the beak begins to harden, toes and leg scales start to show, the skeleton begins to calcify, and chick down appears. On the fourteenth day, the embryo rotates to arrange itself parallel to the long axis of the egg, normally with the head towards the large end. On the seventeenth day, the chick turns its head, placing its beak under the right wing toward the lower part of the enlarged air cell.[78]

Hatching

On the nineteenth day, the yolk sac begins to enter the body through the umbilicus, and the chick positions itself for pipping the shell, that is, for making a hole in the shell to breath through while struggling to get out. On the twentieth day, the yoke sac completes its absorption into the body cavity and the umbilicus begins to close. By now, the chick occupies the entire area within the shell except the air cell, which it now begins to penetrate with its beak, inhaling outside air through its lungs for the first time. After pipping the shell to reach the air cell, the chick rests for several hours. It then cuts a circular line counterclockwise around the shell by striking the shell with its eggtooth near the large end of the egg, aided by a special "pipping" muscle in its neck which helps it to force its beak through the membranes lining the shell.

With the eggtooth, a kind of rough edge that disappears after hatching, the chick saws its way out of the shell, aided by the mother hen if she is there and help is needed. Ten to twenty hours after the shell is first broken, the chick emerges, wet and exhausted, to face the life ahead.[79]

The split opened, tearing the inner membrane with it and spilling the first chick out on the straw where she sprawled, naked-looking, streaked with wet down. Granny Black picked the last pieces of shell gently from her, slaying every ant that darted in to attack until those left alive had to content themselves scavenging off the sticky remnants of shell.[80]

Nearly two days may elapse between the hatching of the first chick and the appearance of the last member of the brood. Thus, some chicks may be almost two days old by the time all of their brothers and sisters have struggled from their shells, as many as sixteen others. However, hatching is not a haphazard process.

About 24 hours before a chick is ready to hatch, it begins to peep in its shell to notify its mother and siblings that it is ready to emerge.[81] A communication network is established among the chicks, and between the chicks and their mother, who must stay composed and unruffled while all the peeping, sawing, and breaking of eggs goes on underneath her. "During all this time the chorus of peeps goes on virtually uninterrupted, the unborn chicks peeping away, the newborn ones singing their less muffled song."[82] Since some of the eggs may be infertile or aborted, the peeps tell the hen how long she needs to continue on the nest.

Mother Hen and Chicks

As soon as all the eggs are hatched, the hungry mother and her eager brood go forth to eat, drink, scratch, and explore. Baby chicks are "precocial," meaning they are genetically equipped to find food, follow their own kind or whoever is in charge, in the process known as imprinting, and practice hygiene (preen and dustbathe) almost immediately.[83] Their primary dependency is the need to stay warm and dry. Thus,

"Periodically the mother squats down, perhaps alerted by some change in the decibel range of her chicks' peeps—a peep, say, that indicates they are chilled and in need of warmth—and they all dash under her outspread feathers and stay there until they are thoroughly warmed; then out again to continue the search for food and the adventure of exploring the world."[84]

The chicks venture fairly far away from their mother, communicating back and forth all the while by clucks and peeps. The hen keeps track of her little ones on the basis of color, possibly also by smell, and by counting the peeps of each chick and noting the emotional tones of their voices.[85] Should a peep be missing or sound frightened, she runs to find the chick and deliver it—not always successfully—from the hole in the ground, tangled foliage, or threatening predator.

During the first four to eight weeks, the chicks stay close to their mother, gathering beneath her wings every night at dusk. Eventually, she flies up to her perch indicating her sense that they, and she, are ready for independence.[86] Young chickens without a mother huddle together at night for the first month or two. Then one evening you see them practicing sitting in a row, before huddling. Then comes an evening when they are lined up on their perch, arranging and rearranging themselves as before, only this time they stay lined up all night, henceforth roosting at night like adults.

Commercial Hatchery

Chickens waking up in a commercial hatchery have a totally different experience from chicks hatching under a mother hen. A former pharmaceutical company employee described her introduction to this world:

> My first hatchery tour came the next day. For the uninitiated, the hatchery is the place where chicken eggs are incubated in large walk-in incubators. Everything is timed so that on the prescribed day a

particular incubator is opened and most of the eggs have hatched fluffy yellow chicks. The huge wheeled carts inside are rolled out and wheeled down the hall to the waiting window, much like the ones found in school cafeterias where students return their lunch trays. Next to the window were three workers. It was their job to remove each tray of newly hatched chicks from the cart, pick out the live chicks and toss them through the window onto a conveyer belt and then dump the discarded shells into the trash. They did this very quickly. In fact, so quickly that often the conveyer belt would get backed up with the chicks and they would have to stop cleaning off the trays and wait. The men used this time to puff on their cigarettes or just stand there. This would not have bothered me if I had not noticed an overly energetic chick hop onto the edge of the tray and fall onto the floor. The workers ignored the chick and continued smoking. As my eyes followed the chick's descent, I realized that he was but one of many to make that trip. Although they landed apparently unharmed, they did not stay that way.

As soon as all the trays of chicks had been removed from the cart, it was wheeled away, smashing several escaped chicks as it went. The ones that managed to miss being run over by that cart were prime targets of the next cart's wheels. I looked around the floor—it was littered with smashed and half-smashed chicks. Some were trying to move, but couldn't overcome the glue-like hold of their smashed blood-soaked wings. I had to look away and pretend not to notice. I felt that in this situation there was nothing I could say or do that would make any difference.[87]

At the hatchery, male chicks and some female chicks to be used for breeding have their toes cut off at the outer joint of the back toe and inside toe of each foot with an electric toe clipper. The combs of the future male breeders are removed (dubbed) by running a pair of manicuring scissors or shears

from the front to the back of the comb close to the head of the chick.

Dubbing is said to be best done when the chicks are a day old to avoid the severe hemorrhaging that is likely to occur after the first day. Producers are advised not to dub birds in warm climates, as the comb functions to eliminate excess body heat.[88]

Chicks are debeaked at the hatchery or shortly after being trucked to the growout facility. An undercover investigator employed by a company on the Eastern Shore said that after a few weeks, they let him debeak chickens. In the process of having their beaks burned off, the birds chirped loudly and defecated profusely. Many died within 24 hours of shock and blood loss. The stench was terrible. "Smoke rises from the place where the beak meets the machine as the bird loses at least an eighth of an inch of her beak. A few inches higher up, another part of the machine cauterizes her wound. Because of the speed at which the workers handle the chicks, 'hack jobs' result in massive beak loss to some chicks, leaving them unable to eat."[89]

Many birds are debeaked twice if the procedure is done wrong the first time. Improperly cauterized birds bleed from their wounds. "Bleeders are easy to recognize by the spots of red down their fronts or under their wings where the birds have tried to preen. In pain, these birds flap their wings, push against the machine, and often lose control of their bowels."[90]

Chicks are vaccinated at the hatchery against Marek's disease and other contagious diseases by a combination of mechanical injectors, vaccine sprays, and manual syringes. Manual vaccination is an ugly ordeal. Workers handling 7,000 to 8,000 birds a day—2,500 to 3,500 chicks per hour per worker—grab baby chicks and hold them while an automated vaccination needle punctures the back of their necks.[91] Vaccination is a primary cause of infection in the young birds. The puncture breaks and may even tear the skin during the rapid process, and the same needles are used over and over again, spreading contamination.[92]

Automated egg injection systems, designed to inoculate 20,000 fertile eggs an hour against Marek's disease on the 18th day of the 21-day incubation period, are increasingly favored by the big poultry companies to reduce manual labor and the stress of harsh handling that stunts the birds' growth rate.[93]

Treatment of Parent Flocks

Chicks destined to serve as parent flocks are injected again in the breeder houses. Workers at Hudson's breeder house in Maryland "catch three birds at a time and hold them by both wings held together behind their backs to expose the chest and wing pit, where the injections are administered." Holding the birds one can "feel things inside the wings snapping." As a bird is lifted for an injection, "her squawking becomes faster and higher and takes on a frantic tone." Workers use the same needle on one chicken after another, causing subsequent infection in many birds. Many of the birds suffocate or are crushed while being cornered for vaccination.[94]

Not surprisingly, many employees vent their frustrations on the birds. A supervisor reportedly swore "about a bird who had escaped during unloading and eluded capture, threw a board at her and missed, then kicked her four or five feet into the air.

Another shouted obscenities at a chicken he blamed for having made him fall and twist his ankle, then lunged at her, throwing his whole weight on her, and punched her twice. Another, who broke the wing of a bird causing a bone to protrude, blamed the chicken for not letting him catch her."[95]

Why Look at Chickens

This is the world that we have made for chickens to live in. Some people feel threatened by the prospect that in recognizing and upholding the dignity of other living beings, we betray our own dignity as a species. It should rather be

asked how the human species gains dignity by creating worlds such as this for anyone to live in. Can one regard a fellow creature as a property item, an investment, a piece of meat, an "it," without degenerating into cruelty and dishonesty towards that creature? Human slavery was brutal. Does anyone really believe that nonhuman slavery operates on a higher plane?

We need to change. Let us change. Let us begin to see chickens, and the world we share, with more envisioned eyes. Alice Walker wrote of her experience:

> It is one of those moments that will be engraved on my brain forever. For I really saw her. She was small and gray, flecked with black; so were her chicks. She had a healthy red comb and quick, light-brown eyes. She was that proud, chunky chicken shape that makes one feel always that chickens, and hens especially, have personality and will. Her steps were neat and quick and authoritative; and though she never touched her chicks, it was obvious she was shepherding them along. She clucked impatiently when, our feet falling ever nearer, one of them, especially self-absorbed and perhaps hard-headed, ceased to respond.[96]

Whenever I tell people stories about chickens enjoying themselves, many become very sad. The pictures I am showing them are so different from the ones they're used to seeing of chickens in a state of absolute, human-created misery. Many people are amazed to learn that a chicken has a personality, an individuality. This is why we have to start looking at chickens differently, so that we may see them as Walker says she "absolutely saw" the Balinese chicken crossing the road one day with her three little chicks. She explains that having perceived the being of this particular chicken, she can never again not see a chicken. Her obligation to "a sister . . . [whose] love of her children definitely resembles my love of mine" starts with this moment of vision.[97]

Chapter 3
The Life of the Battery Hen

> We have followed the laying hen from the trees to the barnyard and through a multitude of types of laying quarters to today's buildings that are fully automated as well as light and temperature controlled. We have seen how chore time for feeding, watering, cleaning and gathering of eggs has been greatly reduced by improved technology. Old practices such as routine culling of non-layers are no longer followed, and new practices like forced molting have been introduced.
> Wilbor O. Wilson, "Housing: Environment Has Been Man's Concern Ever Since The Hen's Jungle Days"[1]

> In no way can these living conditions meet the demands of a complex nervous system designed to form a multitude of memories and to make complex decisions.
> Lesley J. Rogers, The Development of Brain and Behaviour in the Chicken[2]

Egg laying in birds is a biological activity based on the ingestion and absorption of a specific combination of nutrients in the presence of light. A hen knows how to select the calcium and other nutrients she needs.[3] Her sense of the length of the day enables her to synchronize her periods of laying with the cycles of nature. Sunlight passes into her eye, sending a message to her brain which in turn passes its own message to the anterior pituitary gland which produces a hormone that causes the ovarian follicle to enlarge. The ovary generates the hormones, or sex steroids, that stimulate the processes required to form an egg.[4]

For example, estrogen sparks the development of the medullary bone for calcium and the formation of yolk protein and lipids (fat) by the liver.[5] It increases the size of the oviduct, enabling it to produce albumen proteins, shell membranes, calcium carbonate for the shell, and the shell

cuticle which acts as a lubricant during the laying process and subsequently as a dry shield against bacterial penetration of the egg once it has been laid.[6]

Caged layer producers artificially stimulate and extend egg production by keeping the lights burning for 16 or 17 hours a day to force the pituitary gland to secrete increased quantities of follicle-stimulating hormone, which in turn activates the ovary.[7] This process simultaneously exploits and defies the natural biological and seasonal rhythms of egg production. The wife of a management team at a caged layer facility in Maryland told us during a tour, "It is hard on the hens. Don't think we don't know this."[8]

More laying hens are slaughtered in the United States than cattle or pigs.[9] Commercial laying hens are not bred for their flesh, but when their economic utility is over the still-young birds are trucked to the slaughterhouse and turned into meat products. In the process they are treated even more brutally than meat-type chickens because of their low market value. Their bones are very fragile from lack of exercise and from calcium depletion for heavy egg production, causing fragments to stick to the flesh during processing.[10] The starvation practice known as forced molting results in beaded ribs that break easily at the slaughterhouse. Removal of food for several days before the hens are loaded onto the truck weakens their bones even more.[11]

Currently, the U.S. egg industry and the American Veterinary Medical Association oppose humane slaughter legislation for laying hens on the basis that their low economic value does not justify the cost of "humane slaughter" technology.[12] The industry created the inhumane conditions that are invoked to rationalize further unaccountability and cruelty.

First Hand Impressions

It is difficult to convey to anyone who has not witnessed it directly the treatment of the laying hen in the 20th century. Page Smith and Charles Daniel state in *The Chicken Book* that

the rows upon rows of birds, with their mutilated beaks, in the small cages, are "like a glimpse into an Inferno as terrible in its own way as any of the circles of Dante's hell."[13] Lynn Shepherd, a college student, described her tour of the Milton Waldbaum egg farm in Colorado:

> Joy [the manager] was explaining various functions of the different machines as I was eagerly searching for a glimpse of the thousands of chickens I could hear squawking. Soon we rounded the corner and all my fears came to life. The appearance of the chickens was like all the horrible pictures I had discovered in my research, those pictures that I had thought were so exaggerated. The chickens were without any neck feathers and their necks were covered with blisters. Their wings were bare with an occasional half feather extended from them. The second cage I looked at contained a dead purple, featherless carcass on the bottom of the cage. Joy explained that the chicken house attendant must have missed this one when he did his morning rounds.[14]

A woman who was thinking of starting a backyard chicken flock purchased four "spent" hens from a commercial farm in Massachusetts:

> My own first impression was "these are not chickens, oh no they aren't." In front of me in the dust lay (not walked, lay) four small bodies, barren of the feathers I knew that nature had endowed to chickens. Toenails were 4½ inches long. Words like "pathetic" and "sick" and "ravaged" leapt to mind and then to tongue. In all our reading about raising chickens, in all those home-steading books and Extension Service pamphlets, never had we seen described what life on the egg farm does to the body of the hen. Now we know.[15]

The egg industry misleads the public to believe that "hens are dumb"[16] and that concern for their suffering is mere sentimentality: "Humans love freedom and open spaces for themselves; hence, some people ascribe these

same feelings to chickens."[17] Indeed, "Anyone who is in a layer house early in the morning, will hear the chickens sing. They are comfortable; they are happy."[18] The manager told me this exact same thing during my tour of a battery facility in Maryland in which 125,000 debeaked hens live nine to a 20" X 24" cage amid constant raucous, shrieking noise.[19] In determining the true cost of an egg, the price of denial has to be included with the price paid by the hen, who is systematically tortured in order to produce it.

The Cages

The modern hen laying eggs for human consumption is far removed from both the jungle fowl from whom she derives and the active farmyard fowl of recent memory. She is an anxious, frustrated, fear-ridden bird forced to spend ten to twelve months or more squeezed inside a small wire cage.[20] The cages are stacked in rows in long buildings holding 50,000 to 125,000 hens, like a shoe factory warehouse full of boxes.[21]

In the United States, a 3 to 4 pound hen with a wing span of 30 to 32 inches[22] may be legally confined with four to eight other hens in a cage that is 14-16 inches high and 18-20 inches across.[23] Each hen has an average living space of 48 square inches.[24] United Egg Producers states that "Irrespective of the type of enclosure or system of management used, all birds shall have sufficient freedom of movement. An average of 48 square inches per bird or 12 square inches per pound of bird liveweight is adequate."[25]

However, as Dr. M.R. Baxter points out in The Veterinary Record, "The space available in a battery cage does not allow hens even to stand still in the way they would in a more spacious environment."[26]

Laying Eggs in Cages

In the 20th century, the combined genetic, managerial, and chemical manipulations of the small and lively Leghorn

chicken of Mediterranean descent have produced a bird capable of laying an unnatural number of large eggs[27]—an average 240 to 250[28] a year in contrast to the one or two clutches of about a dozen per clutch laid in a year by her wild relatives.[29] (The average domestic hen will lay somewhere between 25 and 100 eggs a year).[30] Genetic selection for early egg production, to reduce time and money "wasted" on feeding and housing unproductive birds for six months, results in eggs being formed that are often too big to be laid by the immature body of a small, five month old bird. Uteruses "prolapse," pushing through the vagina of the small, cramped birds forced to strain day after day to expel huge eggs. The uterus protrudes, hangs, and "blows out," inviting infection and vent picking by cell mates, from whom the prolapse victim, in severe pain, cannot escape except by dying.[31]

The laying of an egg has been degraded by the battery system to a squalid discharge so humiliating that ethologist Konrad Lorenz compared it to humans forced to defecate in each others' presence. In his article, "Animals Have Feelings," Lorenz states: "Everyone knows what a battery hen looks like. Bloody combs, misshapen claws, etc. There has been much debate over the frustration of the instincts of such battery hens. This has been proved beyond the shadow of a doubt by the limitation of mobility, the beating of the wings. . . . The animals expert knows what a terrible sight it is to see a hen trying time and again to crawl under the other hens in order to find cover and protection. There is no doubt that hens in these conditions tend to delay laying their eggs. Their hesitation to lay their eggs in the close neighborhood of the other cage inmates is just as instinctive as the hesitation of a civilized person to defecate in front of others in a similar situation."[32]

A free hen carefully chooses her nesting site and prepares her nest in a purposeful manner, known as the laying ritual. During this time, she composes herself to enable her body to conduct the intricate processes that culminate in the laying of the egg. As Lorenz noted, a hen will normally wait to lay

her egg until she is comfortably settled in her favorite place. At our house, all of our hens have their favorite nesting areas, including an oval niche amid a pile of books in the cellar, made by our hen, Charity. She will fret and pace back and forth in front of the cellar window on the opposite side of the house, and anxiously run back and forth to me, if the door is closed blocking her steps to the basement when she is ready to lay. There is no mistaking her meaning.

Poultry researchers have described the futile attempts of caged hens to build nests and their frantic efforts to escape the cage by jumping at the bars right up to the laying of the egg. Deprived of nesting materials, a caged hen will stereotypically "pace" in the 48 square inches allotted her instead of sitting quietly on the nest.[33] Finally, the egg drops from her body onto the wire cage bottom, then onto the moving conveyer where it rolls out of sight.

Diseases and Syndromes

Disease and suffering are inherent features of the battery system in which the individual hen is obscured by gloom and by thousands of other hens in an environment deliberately designed to discourage perception, labor, and care. Forcing a physically active bird to assume a cramped and stationary position for life on wire mesh produces diseases that are complicated by abnormal reproductive demands: muscle degeneration, poor blood circulation, accumulation of flaccid fat, oviducts clogged with masses and bits of eggs that can't be expelled, osteoporosis, and foot and leg deformities.[34] The very filth of the debeaking machines, vaccination equipment, and overall living conditions has generated an incurable disease in laying hens known as Swollen Head Syndrome.

Foot and Leg Deformities

The feet and legs of chickens contain complex joints including many small bones, ligaments, cartilage pads, tendons,

and muscles that enable them to search and scratch for their food on land that is rich in natural compost, insect and plant life. Marian Stamp Dawkins explains, "Junglefowl, which are the wild ancestors of our domesticated chickens, spend long hours scratching away at the covering of leaves that hides one of their favorite foods—the minute seeds of bamboo. An ancestral memory of this way of life seems to have carried down the generations into the cages of our modern intensive farms so that even highly domesticated breeds have the same drive to scratch away to get their food—if they have the opportunity."[35]

Despite these facts, the battery hen spends her entire life standing and sitting on thin, sloping wire mesh rectangles designed to facilitate manure removal and the rolling of eggs onto a conveyer with minimum breakage.[36] Her feet become sore, cracked, and deformed. Her claws, which are designed to scratch vigorously, and thereby stay short and blunt, become long, thin, twisted, and broken. They can curl around the wire floor and entrap her, causing her to starve to death inches from her food and water.[37] When the chicken catchers violently wrench the hens from the cages at the end of the laying term, limbs and claws are frequently left behind.[38]

In experiments where hens are offered a choice between wire mesh floors and more natural materials, the wire-mesh floor is "quickly abandoned in favor of floors consisting of peat, earth or wood-shavings. . . . If hens that have been kept all their lives on wire floors with no sight or contact with anything that could be scratched or raked over are suddenly, at the age of 4 months, given access to a floor of wood-shavings or peat, even these naive hens have an immediate and strong preference for these more natural floors over the wire ones, which is all they have known until then. They dustbathe, eat particles of peat and scratch with their feet. It is not just the extra comfort afforded by a soft floor that attracts them, but all the behaviour they can do there as well."[39]

Caged Layer Osteoporosis

Caged layer fatigue is the term that is used to describe the condition of osteoporosis—loss of bone tissue—in laying hens. It is characterized by the inability of the birds to stand, bone fragility, paralysis, and fractures when birds are removed from the cage. Birds have a washed-out appearance in their eyes, comb, wattles, legs and feet. Disuse osteoporosis, resulting from lack of exercise, is exacerbated by secondary osteoporosis, the demineralization of bones and muscles for constant eggshell formation in hens specifically bred for high production.[40]

David Sullenberger, a biologist, explains the history behind caged layer fatigue:

> "Caged layer fatigue" syndrome became a real problem across the industry right after great quantities of birds began being confined in cages in the late 1950's. Until that time layers were floor birds much as broilers are today—with a big exception—and that is the layer houses had windows or skylights or sometimes both in the north, or were practically wall-less in the south and California. That is to say the birds received a lot of sunlight even though much of it was reflected. Being chickens they also scratched around in the litter a lot and pecked at and ate a lot of what they found down there. Much of what they found was manure, or bits of food and litter with manure on it. In spite of the opinion and reaction of disgust of many humans, chickens, like many animals, are mildly coprophagic—meaning they eat their own feces. (Among domesticated animals rabbits are the champions—they have evolved coprophagy to such a high state their digestive systems even form and pass special "soft" pellets which the rabbit must reingest to remain healthy. It is a fair analogy to cud chewing in ruminants.
>
> As a result of their coprophagy the birds were getting enough calcium, phosphorus and magne-

sium back into their systems to supplement what they were being fed in their rations, which at the time, due to ignorance, were only marginally enough for good bones and high egg production. They were also getting sunlight, which meant they were getting ultra-violet, which in turn meant Vitamin D was being properly activated and calcium transport was very efficient.

When cages came into vogue, ration formulations didn't change. The birds could no longer get the supplementation from the manure, eggshells came from the bones, and the bones became weaker and weaker. The smooth muscle tissue (heart, arteries) no longer had sufficient calcium ionic exchange because serum levels were low or out of balance or both. There were more heart attacks, and stress levels were elevated because birds were confined and the social order was completely messed up. Immune response became compromised, and bacterial and viral infections wiped out many birds.

Caged layer fatigue syndrome became a virtual epidemic. Hundreds of thousands of birds across the nation were dying—virtually at the same age and stage of production. The industry panicked and nearly went back to floor houses. Would that they had. As you can imagine, a massive research effort was launched, the various problems surfaced, feed formulations were modified, Vitamin D-3 was added along with some other modifications to feed formulation, and "research once again triumphed over Nature."[41]

Actually, the problem has not been solved. Even though bone fragility has made the disposal and use of "spent" hens "one of the biggest problems the egg industry faces today," the industry has not corrected it, even to the extent of better nutrition. As a researcher points out, "Dietary calcium and phosphorous levels are fed for egg shell quality and economics, not for maintenance of bone quality in the hens."[42]

Fatty Liver Syndrome

Fatty liver hemorrhagic syndrome is an ugly new disease characterized by an enlarged, fat, disintegrating liver covered with blood clots, and pale combs and wattles covered with dandruff.[43] According to Diseases of Poultry, "small hemorrhagic areas may be seen beneath the liver capsule. The liver is yellow, greasy, and of mush-like consistency. Large deposits of fat may line the abdomen and cover the intestines."[44]

Swollen Head Syndrome

This incurable infectious disease, also known as facial cellulitis, attacks hens who are used for both breeding and commercial egg production in intensive confinement systems. The hen's face puffs out as a result of swelling of the layers of cellular tissue beneath her skin, which is full of pus underneath. Swollen Head Syndrome is accompanied by egg peritonitis, mucus congestion, nasal discharge, and nervous signs ("cerebral disorientation"). It has been identified with the turkey rhinotracheitis pneumovirus (another disease of confinement) and with secondary bacteria, especially E. coli. It is caused by "poor management practices" and "poor general hygiene."[45]

A rescuer of spent hens in Mississippi who encountered the disease was told by a veterinarian, "Basically, what this translates into is that these birds were kept in filth. It wasn't necessarily the droppings, but just that the environment itself is filthy."[46]

Salmonella

In recent decades, hens' oviducts have become infested with Salmonellae bacteria that enter the forming egg, causing food poisoning in consumers. While in the past, Salmonella infections were usually traced to dirty or cracked eggs contaminated from the outside by chicken droppings, Salmonella can

now be found inside the intact egg shells. John Avens, of Colorado State University, explains the living conditions that contribute to Salmonella poisoning:

"Salmonella infection of animals will occur more frequently and affect more individual animals, as concentration of confinement increases. (Range-reared animals are not as apt to infect one another, as are intensely confined animals.)"[47]

Antibiotics

Antibiotics increase the problem by disrupting the hen's intestinal microflora and immune system.[48] Antibiotics are given to battery hens to control the bacterial diseases that thrive in crowded confinement, and to manipulate egg production.[49] For example, virginiamycin is said to increase feed conversion per egg laid, bacitracin to stimulate egg production, and oxytetracycline to improve eggshell quality and extend the period of high egg production and improve feed efficiency in the presence of stress and disease. In Factory Farming, Johnson estimates that about 50 percent of British laying hens are routinely dosed with antibiotics, and that in the United States the figure is nearly 100 percent.[50] The overuse of antibiotics in animal agriculture has caused the evolution of "super" Salmonellae and other toxic bacteria that resist antibiotic treatment in chickens, humans, and other animals. According to an article in Newsweek:

> For sheer overprescription, no doctor can touch the American farmer. Farm animals receive 30 times more antibiotics (mostly penicillins and tetracyclines) than people do. The drugs treat and prevent infections. But the main reason farmers like them is that they also make cows, hogs and chickens grow faster from each pound of feed. Resistant strains emerge just as they do in humans taking antibiotics—and remain in the animal's flesh even after it winds up in the meat case.[51]

And in the eggshell, as well. There are many reasons for

this in addition to crowding and confinement. Hybridization of the Leghorn hen for abnormal egg production has resulted in genetic weakness and disease susceptibility.[52] This problem is compounded by the recycling of infectious microbes through commercially manufactured poultry feed, which contains dead birds and poultry by-products including rendered chicken offal (treated waste parts, especially the entrails, of dead chickens) and manure.[53]

Manure, Toxic Ammonia, Dead Birds, Expanding Complexes

Manure is everywhere in the caged layer complex. Toxic ammonia rises from the decomposing uric acid in the manure pits beneath the cages to produce a painful corneal ulcer condition in chickens known as "ammonia burn," a keratoconjunctivitis that can lead to blindness.[54] It facilitates chronic respiratory diseases such as infectious bronchitis, caused by an airborne virus.[55]

Ammonia injures the mucous membranes of the upper respiratory tract making it easy for disease organisms to invade and colonize the lungs, air sacs and livers of exposed birds. It enters the blood causing immunosuppression, which further encourages diseases. Studies of the effect of ammonia on eggs suggest that even at low concentrations significant quantities of ammonia can be absorbed into the egg.[56]

Worldwide, fresh eggs are increasingly rare as egg complexes grow larger and multiply. In the United States, over 70 percent of hens live from day-old to death in steel cages.[57] The baby chicks grow to egg-laying maturity in these cages stacked four decks high ("The manure conveyor belts of all four decks can operate in unison").[58] The remaining 30 percent spend the first six to eight weeks on the floor and are then placed in pullet cages until they are 18 weeks old. They are then transferred to battery cages to begin laying at 20 weeks old. A 1991 University of California survey showed that 97.8 percent of hens laying eggs for human consump-

tion in the U.S. are in cages.[59] According to Egg Industry, "It is estimated that about 75% of the layers in the world are kept in cages and although, in some European countries, the number of floor-kept birds is increasing, the total proportion of caged birds is likely to increase even further because of installations in the developing countries."[60]

The huge chicken flocks produce tons of manure and millions of dead birds. According to a researcher, a one-million-hen complex produces 125 tons of wet manure a day. "[F]or every truckload of feed that is brought into the farm, a similar load of waste must be removed."[61] For every 700,000 hens, 1,500 birds die each week in their cages: "At a three-pound average, that's more than two tons of dead chickens to haul off each week—well over 100 tons a year, at more than $12,000 in transportation and landfill costs."[62]

Broiler chickens are raised on the floor and slaughtered as babies; thus houses can be cleaned out occasionally. However, laying hens are confined in the same building for one or two years in tightly stacked cages, which raises the question of how to remove the manure and the corpses without disturbing production. Mason and Singer explain the manure solution in Animal Factories: "Producers discovered that they could confine layer hens in wire-mesh cages suspended over a trench to collect droppings. The manure pile could be cleaned out without bothering the hens above. At first, producers placed their birds one to each cage. When they found that birds were cheaper than wire and buildings, crowded cages in crowded houses became the rule."[63]

Between 1955 and 1975, flock size on a typical egg farm in the United States rose from twenty thousand to eighty thousand birds per house.[64] Between 1975 and 1992, it rose to 125 thousand or more birds per house. According to Bell, "Today in-line complexes include eight or more, [with] 100,000 or more [hens per house], environmentally controlled hen houses with at least four decks of cages, belt or high rise manure handling systems, often a feed mill, and an egg room for seven-day-per-week packing. Pullets [immature hens] are reared separately. Practically all new farms

would be described as complexes" in which "production and processing [are] in close proximity to one another, and usually includes linkage of the two with egg conveyor belts."[65]

Despite the fact that the manure fumes and rotting carcasses force workers in the houses to wear gas masks,[66] the egg industry claims that the battery cage is more hygienic than the free-range systems and floor systems of the past, because the hens have less direct contact with their own droppings, which are (in principle) deflected by a device to the pits beneath the tiers of cages. The industry does not want to give up cages, citing manure build-up as a reason. "In fact laying chickens will need more drugs to stay alive."[67]

In reality, the "bad old days" refers to the practice of keeping the birds in slum conditions. When birds are crowded, filth accumulates in the ground, the air, and the water, and is passed around by the simple act of breathing. Organisms such as coccidia thrive in the dampness that develops. Chickens do not choose to be dirty. Given the chance, they regularly dustbathe and preen keeping their skin fresh and their feathers soft and lustrous.

Even if the chickens can go outside, the floor of a crowded hen house, and grounds immediately surrounding it, will eventually become contaminated—"fowl sick." The more chickens there are in less space, the more manure there will be. Soon there is more manure and microbial inhabitants than the litter inside and the land outside can healthfully accommodate. The air becomes saturated with ammonia, flies buzz, the place is a mess.

By contrast, fewer chickens with more space means that fewer droppings will be dispersed over a wider area to be dried by the sun and absorbed into the soil. The mineral-rich droppings of a small chicken flock benefit the land. The scratching of the earth by healthy, ranging fowl improves soil fertility.[68] In The Bird Man of Alcatraz, diseases emerged only after the "bird man" began to crowd his prison cell with birds.[69] The cures he invented were for diseases he promoted. This is the type of "progress" of intensive poultry and egg production.

Coccidiosis

Take, for example, coccidiosis. This disease is caused by a protozoan parasite, coccidia, which under normal circumstances lives harmlessly in the gut of chickens and other birds and is shed in their droppings. Birds become exposed to coccidiosis by picking up the sporulated oocysts in these droppings.

Historically, coccidiosis was not a problem. A drug company explains: "Back around 5400 B.C., when the first domestic chickens appeared, coccidia were right there with them. And nature maintained a healthy balance between the two species. Until modern man upset it by raising birds in confinement."[70]

An article in Poultry World states: "Coccidiosis is typically a disease linked to intensive animal production. The reason for outbreaks is that we stock a high number of young, susceptible animals in an environment which is ideal for the reproduction of the coccidia."[71] A chicken breeder from the 1920s recalls that coccidiosis "was just becoming a factor, because of the large number of birds being grown in one place."[72] North states that as the poultry industry grew, so did "the incidence of poultry disease. Greater concentrations of birds within a house, larger houses with more birds and a greater bird density within a given land area was causing high mortality."[73]

"Cannibalism"

The caging and crowding of chickens produces a pecking disorder that the industry refers to as "cannibalism."[74] This distorted behavior is caused by the abnormal restriction of the normal span of activities in ranging species of birds in situations in which they are squeezed together and prevented from exercising their natural exploratory, food-gathering, and social impulses. It includes vent picking, feather pulling, toe picking, and head picking. Pecking in chickens is a genetic impulse developed through evolution, enabling them to

survive in the natural environment. As Rogers says, "In fact, birds must use the beak to explore the environment, much as we use our hands."[75]

Poultry researchers attribute abnormal pecking behavior in confined chickens to a variety of interactive causes. For example, chickens will peck the feathers of cagemates to obtain nutrients they would find on range but cannot obtain to meet individual needs in fixed commercial rations. Mash and pellets exacerbate the problem because the birds cannot select specific nutritional components.[76]

Caged chickens are also driven to peck each other as a result of their inability to dustbathe. Humans bathe in water; chicken dustbathe. Studies by Klaus Vestergaard indicate that hens deprived of dustbathing material suffer from "an abnormal development of the perceptual mechanism responsible for the detection of dust for dustbathing." Without any form of loose, earth-like material, chickens "are more likely to come to accept feathers as dust."[77]

In addition, it has been found that fear is not only a result of pecking at cagemates, but a cause of it. According to Vestergaard. "[T]he peckers are the fearful birds, and the more they peck the more fearful they are. This finding emphasizes abnormal behavior in the evaluation of well-being in animals which have no obvious physical signs of suffering."[78]

A poultry researcher learned the importance of pecking when he designed a method of feeding chicks by pumping slurry directly into their necks. He writes, "The slurry that was fed had the right amount of both food and water, so that the chicks did not need to peck to prehend either feed or water. And, the end of all that research (with Dr. Graham Sterritt, an NIH Fellow) for 5-6 years was that chicks peck independently of whether or not they need to peck in order to eat. I still cannot believe all of the money spent to study that."[79]

A poultry breeder recalls the emergence of cannibalism in the 1920s: "When I was a senior, the University [of New Hampshire] hired a new laboratory man from the West—Dr.

Gildow. He recommended using wire platforms, which let the droppings fall through the floor. This interrupted multiplication of the [coccidia] oocysts. But it led to a completely new problem—cannibalism—and after a year or so wire platforms were out."[80] A poultry nutritionist recalls that when high energy feeds "were not adequately fortified with other nutrients, especially protein, they caused a new problem—cannibalism and feather picking. The problem was aggravated by excessive use of supplementary light. . . . Debeaking helped to control cannibalism and soon became standard practice."[81]

Debeaking

> The emotion-laden word "mutilation" is sometimes used in describing husbandry practices such as removing a portion of a hen's beak . . . [However] removal of certain bodily structures, although causing temporary pain to individuals, can be of much benefit to the welfare of the group.[82]

Egg producers remove up to two thirds or more of hens' beaks with a hot machine blade to reduce "cannibalistic" pecking and lower the cost of feeding the birds.[83] Debeaked birds have been shown to be in chronic pain and distress.[84] Their appetites are reduced, and they do not grasp their food efficiently, which causes them to eat less, fling their food less, and "waste" less energy than intact birds, thereby (it is claimed) saving the industry money.[85]

Debeaking began around 1940 when a San Diego poultry farmer found that if he burned off the upper beaks of his chickens with a blow torch, they were unable to pick and pull at each other's feathers. His neighbor adopted the idea but used a modified soldering iron instead. A few years later a local company began to manufacture the "Debeaker," a machine that sliced off the ends of birds' beaks with a hot blade.[86] Broiler chickens are debeaked once because they are slaughtered as babies, before their beaks can grow back,

although many broiler producers no longer debeak, as the birds are slaughtered before they are old enough to form a social order.[87] Laying hens are debeaked at the hatchery, and often again between twelve and twenty weeks old, before they start laying.[88] An operator debeaks twelve to fifteen birds a minute, one bird every two to three seconds.[89]

Lyon Electric Company, of Chula Vista, California, touts its 6-10 day old precision beak trimming method as the most popular type used to trim breeder and layer chicks, noting that "Failure to beak trim properly can damage bird livability and uniformity. It can cause starve outs, feed wastage and even cannibalism it was to prevent. This adds up to lost profits."[90] Poultry manuals advise would-be chicken farmers that if an electric beak trimmer is not handy, a temporary form of trimming can be done using a sharp jackknife or a pair of scissors.[91]

In defending "beak trimming," the poultry and egg industry deceives the public that (1) chickens are cannibalistic by nature; (2) the chicken's beak is just like a human fingernail; and (3) the procedure is not painful.[92] In fact, debeaking was fully explored by the Brambell Committee, a group of veterinarians and other experts appointed by Parliament to investigate animal welfare concerns arising from intensive farming in the early 1960s. The Committee reported that there is no physiological basis for the assertion that the operation is similar to the clipping of human fingernails: "Between the horn and bone [of the beak] is a thin layer of highly sensitive soft tissue, resembling the quick of the human nail. The hot knife blade used in debeaking cuts through this complex of horn, bone and sensitive tissue causing severe pain."[93]

In 1992, a poultry researcher at the University of Guelph in Ontario explained why "there is now good morphological, neurophysiological, and behavioral evidence that beak trimming leads to both acute and chronic pain."

> The morphological evidence is that the tip of the beak is richly innervated and has nociceptors or pain receptors. This means that cutting and heating the

beak will lead to acute pain. In addition, it has been shown that as the nerve fibers in the amputated stump of the beak start to regenerate into the damaged tissue, neuromas form. Neuromas are tiny tangled nerve masses that have been implicated in phantom limb pain (a type of chronic pain) in human beings.

The neurophysiological evidence is that there are abnormal afferent nerve discharges in fibers running from the amputated stump for many weeks after beak trimming—long after the healing process has occurred. This is similar to what happens in human amputees who suffer from phantom limb pain.

The behavioral evidence is that the behavior of beak-trimmed birds is radically altered for many weeks compared to that which occurs immediately before the operation and compared to that shown by sham-operated control birds. In particular, classes of behavior involving the beak, namely feeding, drinking, preening and pecking at the environment, occur much less frequently, and two behavior patterns, standing idle and dozing, occur much more frequently. The only reasonable explanation of these changes is that the birds are suffering from chronic pain.[94]

Based on the evidence, the government advisory Farm Animal Welfare Council in Britain declared in its 1991 Report on the Welfare of Laying Hens in Colony Systems that debeaking is "a serious welfare insult [injury, attack, or trauma] to the hens" that "should not be necessary in a well-managed system where the hens' requirements are fully met."[95] Producers know that debeaking causes pain. They have their own term, "beak tenderness," to describe the condition that prompts advice about such things as the need for deep feed troughs to prevent the wounded beak from bumping the bottom of the trough resulting in starve-outs: "Striking the tender beak would certainly be a deterrent to normal feed consumption."[96] Debeaking machine operators

are reminded to do the "very tedious task" of beak trimming carefully. "Too often it is done carelessly. . . . Be sure not to sear the eyes when trimming."[97]

Remember: "An excessively hot blade causes blisters in the mouth. A cold and or dull blade may cause the development of a fleshy, bulb-like growth on the end of the mandible. Such growths are very sensitive and will cause below average performance."[98]

The cruelty of debeaking is compounded by the fact that in being genetically selected for heavy egg production and for early sexual maturation, the modern laying hen has developed the concomitant genetic traits of high-strung nervousness and excitability that can cause her to peck even more than usual.[99]

What can she do? She has no choice but to peck at the only things there, which happen to be her neighbors who are forever rubbing against her skin.[100] Is it any wonder that after a few months caged hens develop a condition known as "caged layer hysteria," in which they suddenly wildly try to fly while squawking and trying to hide?[101]

Debeaking does not stop "cannibalism" anyway. Diseases of Poultry states that "A different form of cannibalism is now being observed in beak-trimmed birds kept in cages. The area about the eyes is black and blue with subcutaneous hemorrhage, wattles are dark and swollen with extravasated blood, and ear lobes are black and necrotic."[102]

Some researchers are doing studies to show that "cannibalistic" pecking can be eliminated without sacrificing productivity.[103] However, the industry says that even if breeders breed more placid hens, "beak trimming may still need to be considered for economic reasons for the reduction of appetite and feed wastage."[104] Another alternative is the use of an electrical current to bore a small hole through the beak at the growth line.

Some days later the tip of the beak falls off. According to the American Veterinary Medical Association, "This technique is currently used on turkeys and requires only the upper beak to be trimmed, but it is not yet feasible on chick-

ens." While admitting that intensive confinement frustrates the natural behavioral needs of chickens and other farm animals, the AVMA concludes that "An unresolved problem is whether or not all or any of the 'natural behavioral needs' should or have to be met."[105]

Dustbathing

An example of a natural behavioral need of chickens that is cruelly frustrated by cage confinement is dustbathing. Chickens dustbathe to clean and refresh themselves, distributing loose earth and the oil from the preen gland at the base of their tail through their feathers to remove built-up oil, dead skin and skin irritants, and to maintain and improve feather structure.[106]

Chickens released from a cage to a suitable area will immediately start making a dust bowl, paddling and flinging the dirt with their claws, fluffing up their feathers, rolling on their sides and stretching out their legs in obvious relish. Vestergaard states that "Dustbathing is another example of a behavior which has been ignored—perhaps not even known—by designers of battery cages."

> Dustbathing is a complicated behavior which takes about ½ hour. It is a significant part of the feather maintenance of gallinaceous [ground-nesting] birds. The behavior occurs in all housing systems for hens, including battery cages, even where there is no "dust" (sand or litter). In these cases, dustbathing is often distorted, since the hen tries to direct the bill-raking pattern towards the food, while taking a posture between half standing and half sitting.
>
> The violent movements toward the wire-floor may cause pain and damage to the feathers, and the other birds often peck violently at a dustbathing bird. Experiments have shown that during deprivation from sand, dustbathing motivation increases. This and other evidence suggests that the motivation is generally high in birds kept without access to dust.

> So, again, we are here dealing with behavior and a motivation system which has evolved in nature but now cannot be manifest, and results in trouble for the animal.[107]

Heat Stress

The ultimate trouble for the caged hen is that she is forced to live in a world which makes no sense to her nature. She did not choose it, she cannot escape it, and she cannot change it.

The caged environment reflects human psychic patterns, not hers. Chickens dustbathe not only to clean but to cool themselves. They do not perspire, so on hot summer days they pant with their beaks open, hold their wings away from their bodies, and dustbathe beneath a shady tree or other refreshing cover. When the temperature reaches 80 degrees F (27 degrees C), chickens start to suffer. They develop heat stress—physiological responses to remove excess deep body heat.[108]

The main source of heat in a caged layer house is the hen's own body heat multiplied many thousands of times. When the house gets hot the hens cannot properly rid themselves of this heat. Body heat mounts. When it reaches about 117 degrees F, chickens die.

Fans, foggers, roof sprinklers, and evaporator-pads are installed in battery houses to reduce the drop in production and high mortality that occur in hot weather. However, poultry units are not air-conditioned, they have plastic nipple drinkers instead of troughs, and when the fans and foggers break down, the birds are stuck. North and Bell state, "The caged birds are completely surrounded by hot air, and have no way to get away from the heat."[109] They lose immunity because the bursal cells responsible for immunological competence are heat sensitive. The result is something like AIDS in humans.[110]

Every summer, millions of hens die of heat stress trapped inside their cages. In the summer of 1995, an estimated three to five million hens died in the heat wave that spread

through the eastern half of the United States.[111] In July 1993, in Massachusetts, 20,000 caged laying hens died of heat suffocation at Westminster Farm, the state's largest battery farm, holding 560,000 birds, when an electrical storm killed the power that runs the fans. According to The Boston Globe, the dead hens were hauled to a waste-to-energy incinerator to be turned into electricity. This was treated as a happy ending; the waste manager was quoted, "It's not an inhumane situation. . . . The farmers don't make the weather happen."[112]

Mash, Mold Toxins, and Mouth Ulcers

Hens suffering from heat stress stop eating, but eating is difficult regardless because of debeaking and because the battery hen must stretch her neck across a feeder fence to reach the monotonous mash in the trough, a repeated action that over time wears away her neck feathers and causes throat blisters.[113] In addition, the fine mash particles stick to the inside of her mouth, attracting bacteria and causing painful mouth ulcers.[114]

Adult chickens require food particles of varying sizes and shapes for oral hygiene. They appear to "prefer the feel of large particles in their beaks"; however, "Hens fed coarse meals devour profits. . . . [T]here is excessive food 'usage' without any improvement in laying performance."[115] As if all this were not enough, certain mold toxins called mycotoxins (aflatoxins and T-2 toxins) poison the mash in hot humid weather causing the hens to develop Mycotoxicosis, or fungal poisoning. Egg production drops. Hens develop mouth ulcers, loss of appetite, pale facial appearance, high disease susceptibility, hemorrhaging of kidneys, lungs, and heart, bruising, and bloody thighs.[116]

Forced Molting

> We passed on through the egg barn. . . . When the lights came on, the cackling and clucking rose to a cacophony, accompanied by the sound of thousands of beaks pecking on metal.[117]

Laying hens are sent to slaughter at 17 or 18 months old or they are kept for another laying cycle, or two, whichever is cheaper. Birds to be reused are force-molted—"recycled"—to prepare them for the next cycle.[118] In this procedure they are partially or completely starved anywhere from two to five to fourteen days, or more. Their food is removed or nutritionally reduced, causing the hormone levels that induce egg production and inhibit feather growth to drop. New feathers push out old ones and the hen stops laying for one or two months instead of four.[119]

Molting refers to the replacement of old feathers by new ones. In nature, all birds replace all of their feathers in the course of a year. The process varies within and according to species, although many birds lose the majority of their feathers in the fall at the onset of the cold season. Egg laying tapers off as the female bird concentrates her energies on growing new feathers and staying warm. Nature discourages the hatching of chicks in winter when food is sparse.[120]

The egg industry uses forced molting as an economic tool to regulate egg prices, renew shell quality, and reduce the fat that accumulates in the oviducts of unexercised hens.[121] Poultry researchers invent, duplicate, and refine starvation methods in experiments designed to promote the commercial use of these methods and perpetuate the research. The three main methods of forced molting include (1) elimination or limitation of food and/or water; (2) feeding the birds low nutrient rations deficient, for example, in protein, calcium or sodium; and (3) administration of drugs and metals including methalibure, chlormadinone, and progesterone, high levels of iodine, dietary aluminum, and zinc.[122]

Food and water deprivation for more than 24 hours was banned in Great Britain by the 1987 Welfare of Battery Hens Regulations.[123] However, there is no law against it in the United States.[124] Dr. Peter Dun, the retired head of the West of Scotland Agricultural College in Ayr, said that battery hens are force molted in the U.S. "until their combs turn blue."[125]

North and Bell state that "A fast of 4 days will usually cause a flock to cease egg production. Longer fasts of up to 14 days will usually give superior results, but extreme care must be taken to monitor body weight losses and mortality."[126] A "very popular" method, developed at North Carolina State University, includes a week of 24-hour continuous artificial lighting prior to food deprivation for fourteen days or more.[127]

Forced molting has been practiced and discussed at least since the turn of the century.[128] In 1967, Bell described nine different experiments. He considered it "interesting" that there was a "trend towards more mortality using the severe starvation methods"—no food for ten days, no water for three.[129] In 1992, he published an article describing the effects on egg production of starving chickens for ten or fourteen days, followed by restricting their diet for fourteen or eighteen days. He concluded, "Fasting periods can range from 5 to 18 days, but the use of these extremes should be examined carefully and economic considerations should be part of any such analysis."[130]

According to Bell, "Since the 1960s, recycling [i.e. forced molting] in laying flocks has become the dominant replacement program for the U.S. table egg industry. Age at flock sale has grown from 75 weeks to 105 weeks for two cycle flocks, and 125+ weeks for three cycle flocks."[131]

Poultry researchers have found a new reason to starve laying hens. Bred to become sexually mature at increasingly younger ages, hens lay small eggs at first. Researchers created this situation and this is their remedy: "The Pre-Lay Pause: A Five-Day Fast Near the Beginning of Production for Improving Early Egg Size of Commercial Laying Hens."

Experiments suggest that "a brief fast near the beginning of production" may be effective in some strains of hens.[132]

Forced Molting Causes Salmonella

Forced molting should be banned immediately. In addition to being cruel and immoral, it causes disease. In experiments with laying hens, forced ("induced") molting "significantly depressed the cellular immune response [of the hens] and increased the severity of a concurrent intestinal Salmonella enteritidis (SE) infection. Molted birds shed significantly higher numbers of SE during the feed removal period [which lasted for two weeks] than the unmolted group. . . . Molting, in combination with an SE infection, created an actual disease state in the alimentary tract of the affected hens whereas, under normal conditions, little SE-induced morbidity occurred in adult birds."[133]

Disposition of Spent Hens

Before going to slaughter, laying hens are deprived of food for an average of four days to "provide a modest net return to help pay for the costs of hen disposition. . . . The greatest benefit of fasting occurs on the third day. In this scenario, fasting a flock provides as much as 3.6 cents extra per hen that can be put against the cost of flock removal."[134]

The hens travel in cages without food or water for hundreds of miles, frequently across state lines or into Canada, often with missing feet, legs, and wings that were left behind during catching. Hens who escape during catching are brutally rounded up from the conveyers and manure pits in which they take refuge. A witness described this savage hen hunt at a complex in Mississippi. The hens were pulled out of their hiding places by neck-breakers who killed or half-killed them and loaded them into dump trucks "piled as high as would allow without pouring bodies over the sides."[135]

At slaughter, spent laying hens are a mass of broken

bones, beaded ribs, oozing abscesses, bright red bruises, internal hemorrhaging, and malignant tumors.[136] Their bodies are shredded into products that hide the true state of their flesh and their lives: chicken soups and pies, school lunches, and other institutional food service and government purchase programs developed by the egg industry and the Department of Agriculture to dump dead laying hens onto consumers in diced up form.[137]

Alternatively, the hens are trucked an average of 200 miles to rendering plants and turned into poultry, pig, and cattle feed.[138] Or they are gassed or ground up alive at the farm and fed back to the hens in the cages.[139] On-farm disposal, such as suffocating the birds in portable gas units, is increasingly favored. It is cheaper than hauling birds worth 2 cents/lb. compared to 15 cents/lb. of "heavy breed meat."[140] A researcher explained at a convention, "The decline in willingness of fowl processors to accept spent commercial laying hens has created a need to develop alternative uses for these birds."[141]

The Fight for Better Conditions

To date, there are no federal welfare laws in the United States regulating the care and treatment of laying hens.[142] An example of what goes on was captured on videotape in 1993 and 1994 during an undercover investigation at Boulder Valley Poultry Farms, the main supplier of eggs for the largest supermarket chain in Colorado.[143] The footage contains unforgettable scenes of hens packed eight to a cage amid the incessant din of bird cries and machinery; hens left to die in a closed wing of one of the sheds; piles of dead chickens; chickens with open sores; decaying broken eggs; mounds of uncovered manure; a stray hen walking over a pile of dead chickens; rats whistling through cages in which claws and other body parts of former inmates lie rotting. Whole cages are shown full of dead hens in various stages of decomposition. A veterinarian from the Colorado Department of Agriculture tells a television reporter that this is normal

business procedure.

The battery cage is legal in Canada, and thus far there are no welfare laws regulating its use. In 1980, the Canadian Federation of Humane Societies began coordinating voluntary codes of practice for all livestock including poultry, with financial support provided by the federal Minister of Agriculture. The resulting Recommended Code of Practice for Handling Chickens from Hatchery to Slaughterhouse (1983) was later expanded to include turkeys. The Recommended Code of Practice for the Care and Handling of Poultry from Hatchery to Processing Plant (1989) states that the cage system "may provide more advantages to bird health than other systems." It recommends 64 square inches (410 square cm) of floor space for a four pound adult hen and such things as cage doors for breeding hens "large enough for manipulation of the chickens during artificial insemination."[144]

Currently, the future of battery cages is under discussion in Europe following production of internal draft proposals for a Directive by the European Economic Community Commission. A 1992 report from the Commission's Scientific Veterinary Committee concluded that the existing battery cage system "does not provide an adequate environment or meet the behavioural needs of laying hens."[145] However, the draft proposals did not propose a ban on the battery cage, just modifications of it. It proposed that from January 1, 1995, the cage should provide at least 800 square cm (120 square inches or 12 inches by 10 inches) of floor space per bird, at least 60 cm (24 inches) of cage height over 65 percent of the cage area, compulsory claw shortening devices (e.g., a strip of abrasive foot-scratching tape added to the manure deflector behind the feed trough as is currently mandated in Sweden), perches, and fully open cage fronts. Debeaking was discouraged but would not be prohibited. All cages would have to comply with these standards by January 1, 2002. If these draft proposals become law, hens will continue to be condemned to life in a cage with a little more wire to stand and sit on and be surrounded by.[146]

Switzerland banned cages in 1992 after prohibiting Swiss

farmers from installing new battery cages beginning in 1981. From 1992, groups of forty or more birds must have access to perches and nest boxes and a minimum of 800 square cm (120 square inches) of wire-grid floor space each.[147] Sixty-five percent of eggs sold in Switzerland are produced by Swiss farmers; the rest are imported battery eggs. (Switzerland has traditionally imported large quantities of eggs.)[148]

Sweden has been testing alternative systems based largely on the developmental work done in Switzerland since the late 1970s. In 1980, the Swedish government decided that from 1999 on, laying hens were not to be kept in cages. In addition, there were to be no increases in the use of medication and no debeaking. In early in 1994, the Swedish Board of Agriculture tried to postpone the ban on cages until 2004, claiming that it is impossible to make changes without losing domestic production; however, the Swedish Parliament decided to keep the ban.[149]

France is the largest egg-producing country in Europe, with a total of 53 million commercial laying hens, of whom 2.4 million hens are in alternative production systems. These include traditional farms and the large "free-range" indoor and outdoor units in which 5,000 hens occupy up to five hectares (about twelve and a half acres), or 10 square metres (100 sq. feet) per hen. In 1992, France set rules for calling eggs alternative ("biological" or "organic") including "nutrition, the age of layers and the space allowed/layer." A growing market for alternative eggs in France is said to represent "3-4% of a stagnant or total market currently."[150]

According to Egg Industry, in 1994, Danish battery cage production suffered under great pressure from animal welfare publicity, increasing demand for alternatively-produced eggs (free range and organic) and increased imports of cheap eggs. (176 million eggs were imported, mainly from Holland and Germany.) Paradoxically, however, "while sales of free-range and organic eggs are increasing as a result of the Danish consumers' demand for higher standards of animal welfare and environmental considerations, the same consumers, in their innocence, continue to buy processed foods

which contain imported battery eggs, produced under different welfare conditions."[151]

A typical battery cage in Britain measures 18 inches by 20 inches (45 cm by 50 cm) and houses five hens. Before January 1, 1988, there was no legal requirement regarding cage space until the Welfare of Battery Hens Regulations 1987 was introduced implementing Council Directive 86/113 of the European Union. The Regulations set minimum standards for battery hens throughout the European Union. The Regulations stipulated a minimum floor space per hen of 450 square centimeters (70 square inches) and cage height of 40 cm (16 inches) by January 1995.[152]

The British government has stated it does not intend to improve farm animal welfare legislation unilaterally and thus be at a competitive disadvantage with other European nations. However, Farm Animal Welfare Network (FAWN) points out that Article 36 of the Treaty of Rome permits Member States to refuse to trade on the grounds of public morality. Article 36 states that "The provisions of Articles 30 to 34 shall not preclude prohibitions or restrictions on imports or goods in transit justified on grounds of public morality, public policy or public security; the protection of health and life of humans, animals or plants." According to FAWN, under these terms, Britain could impose sanctions that would protect British producers, prohibit imports, and help set minimum standards in regard to the treatment of laying hens for other trade nations to follow.[153]

Meanwhile, in Britain, labels on boxes of battery eggs have started to appear at the major supermarket chain, Safeway, with the words Eggs from Caged Hens living in carefully Controlled Conditions. According to Compassion in World Farming, this follows their vigorous campaign for a more accurate labeling of battery eggs with the clear, factual statement, Eggs from Caged Hens.[154]

The caging of laying hens was successfully prosecuted in 1993 in a private suit brought in Hobart, Tasmania, in Australia. Activist Pam Clarke and the Australian organization Animal Liberation brought charges against Golden Egg

Farm following a covert investigation in 1991. During this investigation several hens were purchased from the farm, and videos and photographs were taken documenting the horrible conditions under which the hens were forced to live.[155]

On February 24, 1993, Magistrate Philip Wright found Golden Egg Farm guilty on seven counts under the Tasmanian Prevention of Cruelty to Animals Act 1925.[156] He delivered an historic 18 page judgment against the farm and the battery system. He ruled that the hens were unable to exercise, and in chronic pain because they were forced to rub against the cage wire. He stated that confinement causing the state of the hens submitted in evidence "could not be called other than cruel in my opinion: if a bird is unable to move without affecting, physically, others in the cage nor to lay or rest without affecting itself deleteriously, the cruelty is constant and continual and without relief and, I have no doubt, caused stress in all these birds."[157]

Wright said in a letter, "If I have done a little to hasten the abolition of this vile trade by 'civilized' peoples, I am well satisfied and handsomely rewarded with that knowledge."[158]

Although debeaking was not the issue in this case, Wright condemned it. Abnormal growths, pus, and ulcers in the beaks of several birds were medically entered in evidence.[159] He condemned the whole system: "The only evidence in this case referring to justification or necessity for the cruelty inflicted upon these birds was in the broadest terms as to economy and profitability of egg production, but such references by no means deflect me from what otherwise would be and is my strong view that all these birds have been treated with unjustified and unnecessary cruelty, constituted by great indifference to their suffering and pain."[160]

Shortly after the ruling, Pam Clarke was charged with trespassing at Hobart Parliament House. She was there protesting government efforts to amend the Tasmanian Prevention of Cruelty to Animals Act 1925 to exempt poultry from protection, which would allow the Government to

override the court judgment. She was sent to prison for three weeks.[161] In August 1993, Australian industry ministers agreed to a national review of battery hen farming, with a view to seeking alternatives, but so far nothing has been done.[162]

Animal Liberation branches are poised throughout Australia to launch similar private prosecutions against battery hen farms. Undercover raids in 1995 revealed unspeakable cruelty, filth, misery, and diseases ranging from osteoporosis to cancer, at major battery complexes in Victoria, New South Wales, Tasmania, and the Australian Capital Territory.[163]

Yet despite excruciating video footage, photographs, court testimony, and veterinary reports describing the ravaged condition of approximately 100 rescued hens, of whom over half had to be euthanized immediately, repeated requests to the RSPCA, the Department of Agriculture, and the police have failed to produce any action. Rather, we're told: "The property to which you refer has been inspected on several occasions over recent months by both Agriculture Victoria officers and inspectors from the Royal Society for the Prevention of Cruelty to Animals. These inspections have involved each shed on the property concerned and did not produce evidence of unusual or excess levels of illness or mortality or evidence of deficient flock welfare."[164]

The battle to liberate hens from battery cages has begun and it includes all of us. Wherever we are, we are morally obligated to end the oppression. Battery cages should be banned in the United States and throughout the world. Until they have been discontinued, our species stands condemned of a criminal relationship with the living world. Consumers should boycott battery eggs and discover the variety of egg-free alternatives.

Chapter 4
The Life of the Broiler Chicken

> Aside from the stupendous rate of growth . . . the sign of a good meat flock is the number of birds dying from heart attacks.
> Cathryn Baskin, "Confessions of a Chicken Farmer"[1]

Consumer Trends

In the past, eggs were the primary source of revenue for the chicken industry. In 1960, eggs supplied 61 percent of the gross chicken income in the United States followed by broiler chickens at 34 percent. This changed in 1975 when for the first time broiler chickens supplied 50 percent of the gross chicken income followed by eggs at 48 percent.[2] Since then, broiler chicken sales have dominated the poultry industry in the United States. Of a total producer value of $15 billion for the 1992 marketing year, broiler chickens, eggs, turkeys, and other chickens contributed 61, 23, 16, and less than 1 percent respectively.[3] Currently, the U.S. broiler chicken business is a $25 billion industry compared to a $4.2 billion egg industry.[4]

Changing lifestyles and attitudes about health are reflected in these figures. Between 1960 and 1990, egg consumption dropped from 320.7 to 234.8 per person per year reflecting health concerns about cholesterol, growing fear of Salmonella food poisoning, and the decline of the big breakfast in the American diet.[5] By contrast, poultry consumption rose during this period as chicken and turkey came to be regarded as inexpensive and convenient sources of low-fat protein. In 1995, the average American consumed 236 eggs, 48.4 pounds of chicken, and 14.2 pounds of turkey compared to 63.9 pounds of beef, 49.9 pounds of pork, and .9 pounds of lamb and mutton.[6]

Development of the Modern Broiler Chicken

The development of the broiler chicken industry from a family enterprise to a commercial agribusiness was featured in a special issue of Broiler Industry in July 1976. As the nation celebrated its 200th anniversary during that month, the broiler industry celebrated its 50th, according to the editors. Ray Goldberg, who with John Davis coined the term "agribusiness" in the mid 1950s at the Harvard Business School, observed that "One would have been hard-pressed 50 years ago to find even a dozen flocks of chickens in lots of as large as 10,000 per farm that were being raised especially for supplying poultry meat. Most of the nation's flocks averaged 75 birds per farm per year and were kept for eggs, with meat a by-product when the hen was laid out."[7]

"Broiler" chickens—birds raised specifically for meat as opposed to being derived from egg production and eaten—were reportedly raised as early as 1800 in the South Jersey town of Hammonton using incubators capable of hatching up to 100,000 chicks every ten weeks. A flock of 500 "broiler" chickens was reported in 1917 in Gainesville, Georgia, and 7,000 "broiler" chickens were reported in Smyrna, Georgia in 1901.[8]

The U. S. Department of Agriculture traces the beginning of continuous year-round production of broiler chickens to Cecile Long (Mrs. Wilmer) Steele in Ocean View, Delaware.[9] In 1923, she raised a winter flock of 500 birds, 387 of whom survived for slaughter. The industry sets 1926 as the start of its era. In 1926, Steele and her husband built a year-round farm capable of producing 10,000 chickens, and the first railroad car full of live broiler chickens (as opposed to "run-of-the-farm fowl") was shipped from New Hampshire to New York City at a time when live chickens were being transported from New England to New York by truck and from the Midwest to the eastern markets by train to be slaughtered at the customer's request in the back of the grocery store.[10]

The "broiler" chickens of those days were not the pure white, oversized birds subsequently developed at universi-

ties and land-grant colleges in conjunction with chemical companies such as Upjohn and Merck which own or have owned percentages of the primary genetic breeding stock.[11] They consisted mainly of the black and white Barred Rock chicken, developed by poultry farmers in New England in the early 1800s, and the chestnut-colored New Hampshire chicken, developed by poultry farmers from the Rhode Island Red in the early 20th century. Compared to today's four to six pound bird slaughtered at seven weeks old, these birds weighed less than two pounds when slaughtered at fourteen weeks old.[12]

A major event which led to the development of the modern broiler chicken was the National Chicken of Tomorrow program. This New York City advertising agency competition included two three-year contests paid for by the Great Atlantic and Pacific Tea Company (A & P Food Stores), in 1946-48 and 1949-51. The goal was to develop a "super chicken" by evaluating strains based on meat quality and cost per pound of a 13-week old bird.[13]

Launched in Monmouth, Maine in 1946, with state contests the first year, regional contests the second year, and national contests the third year, the program produced a surprise winner, Charles Vantress, of Marysville, California. Until then, New England had been the main source of breeding stock in the country. Vantress's red-feathered Cornish-New Hampshire cross introduced Cornish blood into broiler breeding, which gave "the broad-breasted appearance that would soon be demanded with the emphasis on marketing that followed the war."[14] Arbor Acres of Connecticut was another big winner. Originally a family-operated fruit and vegetable farm, later a Rockefeller subsidiary, now one of the largest broiler breeding companies in the world, Arbor Acres developed the Arbor Acres White Rock from Plymouth White Rock genetic lines. During the 1950s, white chickens replaced those with colored feathers. Dark pin feathers on carcasses were considered unsightly and were hard to remove. The modern commercial broiler chicken is a highly specialized hybrid in which Cornish male lines and White

Plymouth Rock female lines impart primary characteristics.[15]

The broiler industry's measure of success is aptly characterized in a brochure published by the National Broiler Council, a U.S. trade group, in association with Merck, aimed at college students: "Dramatic changes have taken place within the industry. Instead of 'scratching for their food,' today's pampered chickens are the products of advanced science and technology." Students do not have to worry about learning the truth: "When you choose a career in the poultry industry you may not see a chicken or an egg or a turkey—except at mealtime."[16]

Diseases and Syndromes
Orthopedic Disorders

My own acquaintance with broiler chickens began in the mid 1980s, when I rented a house on a piece of land that included a backyard chicken house in Maryland. In June, about a hundred young chickens appeared one day in the house. A few weeks later the chickens were huge. I knew little about broiler chickens at the time, but I was impressed by how crippled these birds were. I saw what Mason and Singer meant when they said in Animal Factories that "Fleshly bodies of broiler chickens . . . grow heavy so quickly that development of their bones and joints can't keep up. . . . Many of these animals crouch or hobble about in pain on flawed feet and legs."[17]

Broiler chickens are not "too mentally unendowed to even stand upright," as a journalist thoughtlessly quipped about domesticated turkeys plagued with similar genetic problems imposed by the meat industry.[18] They suffer from painful skeletal abnormalities caused by forced rapid growth. Bone calcification cannot keep pace with the rate of growth in these baby birds, a condition that "sometimes results in seepage of pigments from the bone marrow to the surface of the bone when chicken is cooked."[19]

In 1935, the average broiler chicken weighed 2.80 pounds

at 16 weeks old. In 1994, the bird weighed 4.65 pounds at just six and a half weeks old.[20] In 1977, when broiler chickens weighed four pounds at eight weeks old, 43.7 times their original hatching weight, the U.S. Department of Agriculture bragged, "If humans grew at the same rate, an 8-week-old baby would weigh 349 lbs."[21]

In 1990, the American Association of Avian Pathologists identified what it considered to be the three most common bone problems associated with the extremely rapid growth of present day poultry: angular bone deformities, in which the legs become bowed in or out or twisted; tibial dyschondroplasia, in which the bones develop fractures and fissures; and spondylothesis (kinky back), in which the vertebra become dislocated and/or cartilage proliferates in the lower backbone, pinching on the spinal cord and lower back nerves.[22]

In "Pain in Birds," Gentle states that the "widespread nature of chronic orthopaedic disease in domestic poultry," plus the fact that there is a "wide variety of receptors in the joint capsule of the chicken," including pain receptors, supports the behavioral evidence that the birds are in chronic pain.[23]

The suffering of these birds severely increases as they become older and heavier, particularly after the fourth week of age. Most chickens today are slaughtered at six to eight weeks old, three weeks before their young skeletons are fully mature.[24] The demand for more breast meat and further processing for convenience foods, fast food items, international exports, and rotisserie cooking has increased the demand for heavier birds at increasingly younger ages.[25] Traditionally, surgically or chemically castrated young roosters, called capons, were raised for 20 to 24 weeks to a weight of twelve to fourteen pounds before being slaughtered. Today the term "capon" usually refers to a broiler chicken raised for a few extra weeks to roaster size. So-called "roaster" chickens are kept anywhere from nine (female) to eleven (male) weeks and weigh between six and eight pounds at slaughter.[26] Those golden rotisserie trunks, "like a troop of dancing

Rockettes swirling on KFC skewers," were a crippled mass of misery when they were alive.[27]

Lucrative Research

> [W]e're a long, long way from using up genetic gain potential in rate of growth, feed conversion, and how we shape our birds. . . . More and more, the biochemist, physiologist, virologist, immunologist, microbiologist and nutritionist will complement the geneticist's activities in poultry breeding programs. . . . All of this translates itself into relatively large investments in research and development, which in turn must be justified on a R.O.I. [return on investment] potential basis as it relates to the marketplace—market size and market penetration.
>
> Wentworth Hubbard, President of Hubbard Farms, a subsidiary of Merck & Co. since 1974 [28]

Chickens are sensitive living beings. To the companies that own them, they are commodities and investments no different from the byzantine paraphernalia that is used to manipulate and kill them. While modern genetic, chemical, and management practices have combined to create costly and painful diseases in broiler chickens, these diseases generate huge sums of money. They stimulate research and investment. They are the testing ground and target for expensive new pharmaceuticals. Lucrative, perennially renewable government, state university, and private sector contracts are involved. Companies such as Tyson, Merck, Bayer, and Hoffmann-La Roche have their own poultry research facilities. We hear little about these facilities, as the research is kept quiet and is seldom published.[29]

Cruel Research

Until 1988, when he retired, Dr. Eldon Kienholz was a full professor, specializing in poultry nutrition, in the Department of

Animal Sciences at Colorado State University. In an interview with me, Dr. Kienholz talked about some of his research projects.

Could you give an example of the kind of research you did?

Yes. I knew that wings and tails of birds were unnecessary to commercial production of poultry meat, so I did research to show that a grower could save about 15 percent of feed costs by cutting off the tails and wings of broiler chicks and turkey poults soon after hatching. I gave papers on that at national meetings, and attracted a great deal of interest.

What caused you to become skeptical about your work? Was it a utilitarian consideration? A moral twinge?

A moral twinge. Somehow it didn't feel right to be cutting off the wings of newly-hatched birds. Later, some of them couldn't get up onto their feet when they fell over. It wasn't pleasant seeing them spin around on their side trying to get back onto their feet, without their wings.[30]

Troubled Birds

Trapped inside their troubled bodies are birds who differ little from their jungle ancestors and wild relatives. Artificial selection for economic traits has not affected chickens fundamentally. Mench states, "[T]he repertoire of behaviors in most modern poultry strains is virtually identical to that of their putative wild ancestor, the Burmese Junglefowl."[31]

Likewise, the artificial environment does more to mask the chicken's fundamental nature than to alter it. Given the complex interactions between genes and the environment in chickens, Rogers argues that "Commercial housing conditions may enhance the development of certain behavioural patterns and suppress others, thus magnifying the apparent differences between domestic breeds and the jungle fowl." In addition, commercial chicks are deprived of the hen and are thus "unable to experience the passing on from generation to generation of learned preferences in feeding and possibly other behaviours. Consequently, their cognitive pat-

terns must differ from those of chickens raised with the hen in the natural environment."[32]

One example of a natural impulse that remains strong in chickens is the desire to perch. Wild chickens roost in trees. There is evolutionary safety in their being able to survey their surroundings from a perch during the day and to roost in a tree at night when their excellent daytime vision is reduced.[33] Commercial chicken houses do not have perches.

Yet given the chance, and without previous experience, broiler chickens will perch until they become too heavy or it becomes too painful to spring.[34] One of our first chickens was a spent broiler breeder rooster named Henry. Despite his 20 pounds and lack of prior experience, Henry insisted on perching every night with his three companions hens. He did this by making two giant leaps, first onto an inverted drum, followed by a hefty spring onto the perch, five feet above the ground. When Henry could no longer jump, he trudged laboriously up the back steps of our house to rest on the porch beside the perch where the hens sat.

Sick Birds Going to Slaughter
Tumors and Infections

The broiler industry tells the public that, thanks to pharmaceutical research, better management, diet and related improvements, poultry diseases have been practically eliminated.

The myth passes despite evidence to the contrary. A kind of Orwellian doublethink prevails. An example is the 1991 report in The Atlanta Journal-Constitution justifying public concern that chicken meat is contaminated and that sick chickens are routinely slaughtered for human consumption. Eighty-four federal poultry inspectors interviewed reported that "Every week throughout the South, millions of chickens leaking yellow pus, stained by green feces, contaminated by harmful bacteria, or marred by lung and heart infections, cancerous tumors or skin conditions are shipped for sale to consumers, instead of being condemned and destroyed."

One inspector said: "I've had bad air sac birds that had yellow pus visibly coming out of their insides, and I was told to save the breast meat off them and even save the second joint of the wing. You might get those breasts today at a store in a package of breast fillets. And you might get the other part in a pack of buffalo wings."[35]

Obesity

Amid these disclosures, a subheading incongruously states, "A well-bred bird begins in the lab: Chickens now heavier, healthier."[36] One wonders how readers would react to being told that human health experts link increased human obesity with improved fitness. That tripling the appetite and number of fat cells in people, and making them consume rich foods without exercise, is "healthier." In reality, chickens are fatter than ever. According to the National Research Council, chicken carcasses have been 10 to 15 percent higher in fat since the 1960s.[37]

> Genetic selection for body weight caused chickens with above-average appetites to be chosen as breeders. As a result, broilers were produced that ate more feed at a given age and became unable to synthesize protein and lean meat fast enough to keep pace with increased intake of food energy. The excess food energy was deposited as lipids, and broilers became fatter.[38]

Geneticists have been searching for a poultry gene to reduce abdominal fat, which could then be inserted into the germ plasm of commercial broiler chicken stock.[39] Merck filed for a European patent on a "Macro Chicken," described on the patent application as a "transgenic fowl expressing bovine growth hormone." The bird includes growth hormones from cattle.[40]

To the industry the dilemma is how to continue to "improve" the bird's rapid growth rate and body weight, while controlling the diseases that accompany the "improvement." While the price is not weighed in terms of the vic-

tim's suffering, at a certain point this suffering starts to cost money. A survey of college poultry professors reported in 1990 that if genetic research follows the course of the past forty years, new metabolic problems and increasingly severe existing problems in broiler chickens can be expected.[41]

A heavy person suffering from painful arthritis, without the relief of medication, can easily imagine how these chickens must feel. Reluctant or unable to move, the birds sit heavily in positions that cause their feet, hocks (the top joint of the leg), and breasts to exert tremendous pressure on the ammoniated floor littered with damp bedding and droppings. In time, the ammonia from the decomposing uric acid in the droppings burns into these sensitive pressure areas causing ulcers to form on the birds' feet and blisters to form on their legs and breasts, similar to bed sores. These skin wounds invite bacteria. Bones, tendon sheaths, and leg joints become infected with bacterial agents such as Staphylococcus aureus that are shed in the droppings in which the chickens have no choice but to sit and stand.[42]

"Multitude of problems plague overweight broiler breeder hens," according to an article in Feedstuffs.[43] They suffer from complicated maladies, including malfunctioning ovaries and breathing problems. They develop heart failure. Our hen Olivia became so fat, even with exercise, that her abdominal air sacs were pinched off (as shown in the x-rays), and she nearly died, barely able to breathe, at ten months old.

Blackouts and Food Restriction

The breeding hen's malfunctioning ovaries result in erratic laying patterns, soft eggshells, low and short-lived fertility, double and triple yolks being laid, embryo loss, and poor mating success "due to physical limitations in the mating process" affecting both males and females.[44] To curb this, broiler breeder chickens are raised to sexual maturity in alterations of total and semi-darkness in "blackout housing" and kept on semi-starvation diets designed to control their

weight and restrict their food intake. Typically, a whole day's food is withheld from the birds every other day starting at a month old.[45] The chickens rush pitifully to the feeders when the food is restored, often injuring their feet and other parts of their bodies in their desperation to eat. Bacteria invade the tissues and bloodstream following these injuries to the skin, especially the feet.[46]

"Feed-restricted" chickens gorge themselves when the troughs are refilled, enlarging the capacity of the crop and gizzard to hold even more food, adding to the birds' frustration. On days when food is withheld, they peck at spots on the floor and drink more water to compensate for the feeling of emptiness. Because this results in loose droppings and wet litter, managers are urged to restrict the availability of water "on feed and no-feed days."[47] As Clare Druce states, "The practice of breeding creatures whose main aims and pleasures revolve around eating, then deliberately restricting their food, is yet another indication of the inhumane nature of the system."[48]

Currently, a new form of cruelty may be in store for these birds. In the early 1990s, a researcher at the University of Georgia was paid to test the commercial use of a nasal implant device to prevent the males from eating the females' food in the breeder houses. A 2½ inch plastic stick is forced through the bird's cere (nasal cartilage) when he is five months old. With the device permanently inserted, sticking out on either side of his face, he cannot poke his head through the feed restriction grill to get at the hens' food.[49]

After 45 weeks of producing fertile eggs plagued by hunger, debeaking, detoeing, decombing, toxic ammonia, and diseases, these breeder chickens are "liquidated" and turned into human animal "food" and nonhuman animal "feed" and pet food products.[50]

Other Diseases

Their offspring, meanwhile, suffer from a wide variety of diseases in addition to those discussed above: skin diseases

like scabby hip syndrome resulting from food restriction, drugs, and filth; gizzard and intestinal injuries causing loss of organ or tissue function; ascites syndrome culminating in congestive heart, lung, and kidney failure; and sudden death syndrome ("flip-over"), or heart attack.[51]

Diseases Traced to the Feeding of Animal Products

For over 70 years, farm animal waste has been fed to farm animals.[52] Mad cow disease—the fatal bovine neurological disorder caused by feeding cattle and sheep waste products to cows—is just one disease manifestation linked to this practice.

Poultry feed containing animal by-products—bone, feathers, blood, offal, manure, condemned body parts of chickens and other sick animal parts—has long been identified as a primary source of salmonella contamination. According to Feedstuffs, "Animal proteins are considered high-risk products as far as salmonella incidence is concerned."[53]

Fish meal and animal waste products contain harmful levels of toxic peroxides that stimulate excess gastric acid secretions in chickens resulting in gizzard erosion and lesions of the small intestine.[54] Studies show that feeding chickens poultry by-products probably increases their man-made susceptibility to congestive heart and lung heart failure through "increased metabolic activity of digestion, absorption, and excretion of protein that cannot be used" plus "poor quality poultry by-product [waste and condemned parts] in the ration."[55] An example is the disease called ascites.

Ascites: Pulmonary Hypertension Syndrome

Ascites syndrome is a metabolic disease of the cardiovascular system in the rapidly growing young broiler chicken. Because of the speed at which the bird is forced to grow, the vascular system "is not as developed as is necessary to sup-

port normal oxygenation of blood."[56] Sometimes called "waterbelly" and "leaking liver," ascites syndrome is being intensively studied—experimentally induced in laboratory flocks around the world—having been estimated to cost the U.S. industry alone more than $100 million a year in premature deaths and slaughterhouse condemnations.[57]

The victims are usually found dead on their backs with bloated stomachs reflecting an accumulation of yellow fluid and clots of material in their body cavities. Birds' lungs do not expand like the lungs of mammals, and the lungs of chickens grow more slowly than the rest of their body.[58] Their lung capacity does not keep pace with the forced rapid growth of their muscle tissue. As a result, there isn't enough capillary space to carry the amount of blood needed to supply the body's oxygen requirements. The effort of the heart to pump enough blood through the lungs results in high blood pressure in the blood vessels of the lungs, and in the blood vessels from the right side of the heart to the lungs.

When the blood vessels of the young bird's lungs cannot get enough oxygen, they constrict, decreasing blood flow and increasing blood pressure. To improve the delivery of oxygenated blood to the body tissues, the bird's kidneys produce a hormone that stimulates red blood cell and hemoglobin (the oxygen- carrying protein) production. However, this compensation causes the blood to become more viscous—sticky and adhesive—which in turn forces the right ventricle of the heart to pump even harder to force the more viscous blood into the pathologically constricted blood vessels of the lungs. To adapt to the strain, the bird's heart chambers dilate, and the muscle fibers of the right heart ventricle, which pumps blood returning from the peripheral body tissues back to the lungs for more oxygen, hypertrophy, or thicken.

Together, these events cause the heart valves, which keep the blood flowing in one direction, to weaken, "and the blood begins to leak backwards."[59] If the bird does not suffocate at this point, "the heart continues to fail, leading eventually to damming up of blood in the veins and the visceral

organs."[60] As blood fills the veins, and organs swell, the pressure becomes so great that venous blood fluid begins to leak into the organ cavities. The normally low-pressure vessels of the liver are particularly vulnerable. As a result of the now inefficient valves of the right heart, blood rising from the liver to the heart begins to seep from the surface of the liver, until the ability of the abdominal membrane to resorb it is surpassed and the abdominal cavity fills with fluid. I watched the progress of a similar type of endemic disease in our rooster, Phoenix. Already, as a tiny chick, Phoenix had ominous sounds in his chest. Eventually, the right side of his face filled with fluid and his right eye swelled shut. His crow gurgled as if he were under water. At the least stress, his comb turned blue. He collapsed and died in the yard at 14 months old.

Ascites is often underway even before the birds hatch because of "industry demand for increased incubator egg density and chick output, producing mild-to-severe embryonic hypoxia [oxygen deficiency]."[61] Thus, many chicks break out of the shell already coping with cardiopulmonary disease.

Toxic Air

The chicks are then taken to live in an oxygen-deficient shed full of pathogenic microbes, carbon dioxide, methane, hydrogen sulfide, excretory ammonia fumes, lung-destroying dust, and dander (tiny particles of feathers and skin).[62] Eight hours of the standard minimum amount of ammonia in the average commercial chicken house—25-35 parts per million as established by the U. S. Office of Safety and Health Administration (OSHA)—is considered the maximum allowable concentration for an adult human being.[63] This is an important fact given that chickens need three times more air volume than humans per kilogram of body weight to meet their oxygen requirements.[64] Poultry house air is polluted with many substances of which excretory ammonia is the most prevalent.[65] A person entering a chick-

en house holding thousands of birds experiences a burning sensation in the eyes and deep in the throat. A nauseous odor prevails. What causes this?

Excretory Ammonia

Excretory ammonia is a colorless irritant gas produced by microbial activity on the nitrogen excretion content, uric acid, in poultry manure.[66] Though not a problem under natural conditions, in the densely-packed poultry unit, the breakdown of manure becomes poisonous. Poultry workers experience eye, lung, and nasal irritation. They develop headaches, nausea, wheezing, coughing and other respiratory symptoms. Prolonged intermittent exposure can lead to chronic respiratory disease and to feeling unwell much of the time.[67] This situation is bad for people, but it is worse for the chickens, who cannot escape their noxious surroundings.

Like people, they develop diseases of the upper respiratory tract and eyes. Ammonia dissolves in the liquid on their mucous membranes and eyes to produce ammonium hydroxide, an irritating alkali-causing ammonia-burn that stimulates the production of excessive mucous in the trachea.[68] This mucous mats, and ultimately destroys, the tracheal cilia which serve to block the entry of harmful agents into the system, inviting colonization of the airways by airborne microorganisms such as E. coli bacteria and Newcastle disease virus. Chickens exposed to 20 ppm of ammonia for forty-two days develop pulmonary congestion, swelling, and hemorrhage. Increased ammonia thickens the arterial walls and shrinks the air capillaries in exposed birds.[69] Ammonia stress in chicks and young chickens harms their developing immune systems, causing "severe vaccine reactions."[70]

Chickens exposed to 60 ppm of ammonia—a common level in broiler chicken houses—develop keratoconjunctivitis, a painful inflammation and erosion of the eye cornea and the conjunctiva, which is the mucous membrane lining the inner surface of the eyelids and covering the front part of the

eyeball. Afflicted birds cry out in pain.[71] Their back feathers between their wings become damp and matted. They "tend to close their eyes and are reluctant to move. They may rub their head and eyelids against their wings and may not eat. High levels of ammonia in the poultry facility can cause a cloudy appearance in birds' eyes and blindness."[72] Birds blinded by ammonia die of hunger and thirst, unable to find food and water.[73]

Ammonia is an economic problem,[74] because it increases bird mortality, retards the birds' growth rate, impairs the immune system increasing susceptibility to E. coli infections, and causes condemnation and downgrading of carcasses at the slaughter plant.[75] Growers are urged to note when the ammonia concentration in the poultry house exceeds 25 ppm, an innately harmful level. They are reminded to check concentrations at bird level, close to the litter where the uric acid decomposes, and the combination of water vapor, litter moisture, heat, carbon dioxide, micropathogenic activity, and ammonia is most intense. However, their noses quickly acclimate, particularly as their own respiratory problems increase.[76]

Ammonia levels are especially high in poorly ventilated houses, and during the winter, when ventilation is reduced to conserve heat. At such times, the ammonia concentration can go as high as 200 ppm.[77] Condensation during the winter wets the litter, releasing ammonia fumes into the air and increasing painful breast blisters and manure burns in the birds.[78] A poultry grower recalls the human experience:

> During the winter, when vents could only be cracked because of the frigid outside air, we were often forced from the building, gasping from the high concentration of ammonia. Breathing becomes painful if not impossible; eyes sting and water. During such times we toyed with the idea of liberating the birds, and ourselves, from the confines of the windowless, stinking imprisonment.[79]

Overcrowding

To the toxic air is added lack of living space. A Perdue pamphlet states: "Chickens are naturally a flocking animal, so the question of the space they need is irrelevant."[80]

Consider the following proposition: "Humans are gregarious by nature, so the question of the space they need is irrelevant." Does the human instinct to "flock" together and be social mean that as individuals we have no spatial requirements? The need for personal space is as basic to birds and mammals as is the need to be together.[81] Personal space is completely relevant to a chicken's well-being.

Nevertheless, "As the demand for poultry products increases, so does the need to increase production. As a result, most broiler producers have expanded or increased bird density in the poultry houses, reduced to a minimum the time period between growouts, rushed the disinfection procedures, and raised several flocks [of 20,000 or more birds] on built up litter. Of course, a favorable economic atmosphere motivates these management practices. However, more diseases will be encountered."[82]

This trade-off is accepted because, while poor management causes more filth, disease, and death, more pounds of flesh are obtained as a result of the volume of birds being raised and the volume of medication employed to prop them up long enough to get them to market. The National Broiler Council tells the public that "Economic profitability cannot be achieved without careful attention to the welfare of the broiler chicken."[83] However, this is not how the system actually works. Chickens can be profoundly mistreated and still "produce," just as profoundly abused humans can be overweight, sexually active and able to produce offspring. Like humans, chickens can "adapt," up to a point, to living in slum conditions. Is this an argument for slums?

The welfare of the birds and the economics of floor space per bird in the broiler house are inversely related. North and Bell explain that "The more you crowd broilers and roasters, the poorer the results. However, as floor space is reduced per

bird, the greater the weight of broilers produced in the house, and this will, up to a certain point, increase the return on investment. . . . [L]imiting the floor space gives poorer results on a bird basis, yet the question has always been and continues to be: What is the least amount of floor space necessary per bird to produce the greatest return on investment."[84]

For example, reducing the floor space increases mortality and breast blisters, but it also increases "the pounds of broilers raised in a given house during a 12-month period."[85] By reducing the birds' living space from a square foot to a half square foot per bird, twice as many birds die. However, almost twice as many birds survive long enough to go to slaughter. As a result, the producer gets seven and a half pounds of meat per square foot instead of four—almost twice as much flesh per square foot of floor space. Cobb, a breeding company, recommends that birds in controlled housing be stocked at .8 square feet per bird throughout the year, which gives 13.5 birds one square meter or ten square feet of floor space. Engineers recommend "6 lb. market weight to 1 sq. ft (29.3 kg. to 1 sq. m.) in controlled environment houses."[86]

Recall that one square foot equals 144 square inches and half a square foot equals 72 square inches. Compare this to the fact that a three to four pound chicken needs a minimum of 74 square inches merely to stand, 197 square inches to turn, 138 square inches to stretch, 290 square inches to flap wings, 135 square inches to ruffle feathers, 172 square inches to preen, and 133 square inches to scratch the ground.[87]

These are basic biological activities. Crowding enforces inactivity, reducing the energy—food—that would otherwise be "wasted" by a normally active bird instead of being converted to the flaccid flesh of a sedentary inmate. Crowding encourages passive adaptation to a deadening environment. Chronic deterioration of lively alertness to lethargy in intensively confined chickens is misrepresented as proof that the chickens are "happy," or, alternatively, that they are brainless and unresponsive.[88]

Broiler Chickens in Cages

These falsehoods will become even more believable if the raising of broiler chickens is converted to the multi-tiered cage systems that are being developed in the United States, Eastern Europe, and the Middle East.[89] So far, leg problems, breast blisters, poor growth, and labor costs have prevented the caging of broiler chickens. However, plastic mesh floors with automated manure and bird removal systems are now said to have solved major problems. The same belt that is used to remove and dry manure "can be used for automatic bird collection at the end of the growing period."[90] The floor is pulled from under the birds causing them to drop automatically onto the manure belt which moves them to the rear end of the cage to be collected in containers ready to go to the slaughterhouse. In addition, "Keeping broilers in a multi-tier system will increase the utilization of floor space dramatically. It will be possible to have 2-3 times as many birds in a house compared to floor raising."[91] The birds will be marketed at even heavier weights. A salesman at the Poultry Exposition in Atlanta, Georgia showed me one of these metal and plastic systems that look like cable cars from hell.[92]

Dead Bird Disposal

Millions of chickens die each year of heat suffocation, medication reactions, and disease before going to slaughter.[93] Their bloated, decomposing bodies and skeletal remains can be seen on the poultry house floor, trashed in cans inside and outside the house, and dumped on the ground just outside the door or around back of the building.[94] Eventually, the accumulated carcasses are buried in the ground, burned, or, occasionally, composted. A common practice is to drop the dead birds down feed chutes.[95] Air and ground water pollution, insect infestation, rodents, and odors result from this mortality.

Small, sick, injured, and genetically deformed birds are

"culled"—weeded out and killed. The grower wrings their necks or dumps them alive in landfills to be bulldozed or otherwise buried along with the trash. A Tyson grower told officials in Randolf County, Alabama that she hits sick and injured birds on the head with a stick, and "will not deny that she may have taken live birds to the landfill."[96] A University of Delaware video on chicken production on the Eastern Shore gives an idea of how callously these birds are treated. Growers walk through the chicken house casually breaking the necks of "cull" chicks and toss them, writhing, on the floor against the wall.[97]

Consumers

Some critics have argued that when we eat the flesh and eggs of creatures who have been treated with such complete contempt, we assimilate something of their experience and carry it forward into our own lives. In Diet for a New America, John Robbins asks us to consider the consequences of eating the results of such abuse. Could it be, he asks, that when we consume the flesh and eggs of these poor birds, "something of the sickness, misery and terror of their lives enters us? Could it be that when we take their flesh or eggs into our bodies, we take in as well something of the kinds of lives they have been forced to endure?"[98]

Understandably, one does not like to think that the dead bird one is about to consume embodies the misery and cruelty endured by the bird when alive. So far, all that society has required is that the events that produce the carcass be removed from consciousness. The possibility that the individual's suffering could somehow persist and be present in the body tissues and "juices" about to be ingested is frightful. But is it fanciful?

Invisible Contamination

Once bacteria and other microbes were just a "theory." We could not see them, yet they existed. Historically, the federal

Meat and Poultry Inspection Acts do not mandate inspection for disease microbes in animals slaughtered for food.[99] However, the current infestation of poultry products with poisonous bacteria is not simply the result of an outmoded federal inspection system.

The destruction of the family life of the chicken is a major primary cause. Factory chickens are unable to obtain the parental protection they need. Before the advent of large-scale production systems, normal intestinal microflora, a mixture of hundreds of different types of harmless bacteria that occupy the lining of the chicken's intestinal tract to provide immunity, were transferred from adult birds to their offspring by way of their droppings creating an immediate natural defense. As the chick grew, its own flora developed so that by six months old the bird was healthy and strong.[100]

In modern production, not only is the intestinal microflora of the young chicken incomplete; it is disrupted by the use of antibiotics on which the entire system of raising the birds depends. Antibiotics pump up the birds artificially by causing water retention and by disturbing the composition and interactions of the chickens' microflora, thus increasing susceptibility to colonization by Salmonellae bacteria.[101]

Plans are not underway to reduce the forced rapid growth, crowding and stress. Only superficial solutions are being promoted—carcass irradiation, trisodium phosphate carcass rinse, chlorine dioxide in the filthy slaughter plant chill tank, "competitive exclusion" (manipulating the chicken's intestinal microflora with various combinations of microbes), slaughterhouse robots,[102] and other fake files summarized in the USDA's package for pathogen "hazard analysis" at "critical control points."[103] Real solutions are rejected as uneconomical. A USDA official told a poultry symposium, "[W]e know more about controlling Salmonella than we are willing to implement because of the cost factor. Producers and meat processors generally cannot get a marketing advantage for reducing the Salmonella levels in their raw meat and poultry products."[104]

Once poultry products leave the plant, it is up to the retailer, food handler, and consumer to deal with the contaminated carcass by following strict government guidelines that instruct people "to behave as if they're decontaminating Three Mile Island" just to have a meal.[105]

And what about the increasing pollution of the environment by the chicken industry? For example, a tenfold increase in the number of chickens in West Virginia alone is destroying a 20-year effort to clean up the Potomac River on the East Coast. The Potomac, which nourishes the Chesapeake Bay, is "clogged with excrement from corporate poultry farms," according to a 1997 Report by American Rivers. "In less than ten years, poultry production [in West Virginia] has exploded from seven million to over 95 million birds," resulting in fecal coliform "associated with bacteria that causes severe illness and can also be an indicator of cryptosporidium, which caused the death of over 100 people in Milwaukee in 1993."[106]

Nevertheless, it is possible that in time some of these food safety and environmental problems will be brought under some sort of control, or seeming control, sufficient to satisfy public concern. Counter-technologies will go into effect, and the more affluent sectors of society will adopt stricter standards in the kitchen. Technology and "public education" will be hailed, though nothing will have changed in essence. Meateaters will continue to eat flesh from infested sources only to be "cleaned up" at the end. However, society will feel that the contamination problem has been solved. If this happens, why, then, should anyone care what happens to a chicken?

Chapter 5

The Death

> The last truck pulled out about 3 A.M., the crates packed with quiet huddling birds. The barn was silent, empty, strewn with smothered chickens, empty cans and bottles, occasional piles of human excrement mixed with the birds'. I was only thankful that we didn't have to witness the slaughter.[1]
>
> Cathryn Baskin, "Confessions of a Chicken Farmer"

Numbers of Birds Killed

The death toll of chickens bred for the table exceeds all of our other killings of warm-blooded animals conducted for this purpose. Of the eight billion animals slaughtered in U.S. federally-inspected plants in 1995, 7.8 billion were birds. Of these, 7.5 billion were chickens.[2] Every week, between 125 and 140 million "broiler" chickens are killed in the United States—more than 25 million birds every working day.[3] In Great Britain, more than 600 million "broiler" chickens are slaughtered each year, ten million chickens a week, two million every working day.[4]

To illustrate the comparative number of broiler chickens, a poultry scientist noted that during a certain week in 1993, U.S. hog producers slaughtered 1.7 million pigs, an average of 10,000 pigs an hour that, standing in single file, would stretch 1,200 miles, from New York City to Kansas City, Missouri. During the same week, U.S. broiler producers slaughtered 135 million chickens, an average of 800,000 chickens an hour that, standing in single file, would stretch 25,000 miles, or completely around the middle of the earth.[5]

In 1995, the U.S. egg industry slaughtered over one hundred million "spent" laying hens, and killed 247 million unwanted male chicks at the hatchery.[6] In Britain, approximately 80 million male and female egg-type birds meet this fate each year.[7] When to these figures we add the nearly 60 million

breeding fowl who are currently being slaughtered in the U.S. each year, the millions of birds who die before ever reaching the slaughterhouse, and the more than 7.5 million chickens condemned post-mortem each month for septicemia, tumors, being scalded alive, and other causes, we begin to form an idea of the death toll of chickens for human consumption.[8]

Manual Chicken Catching

At the chicken slaughterhouse each day thousands of birds are crammed inside crates stacked on trucks waiting to be killed. Truckload after truckload pulls into the loading dock. During the summer, huge fans rotate to reduce the number of birds who will die of heat suffocation while waiting to enter the plant. During the winter, an untold number of birds freeze to death in the trucks. Others fall out and freeze to the ground on the docks or somewhere along the way. A forklift picks the topmost pallet of crates off each flatbed truck, and the birds disappear into the darkness.

They came out of the darkness. "Live haul involves hand catching the birds, mostly at night, in a darkened dust-laden atmosphere and trucking them long distances," a United States Department of Agriculture manual explains.[9] Every night in the United States, approximately eight thousand chicken catchers put on throwaway suits, rubber gloves, and dust masks.[10] In a few hours, the masks will be soaking wet and black with dust, and the men will tear them off in order to breathe in the stinking and dust-filled air. The lights of the 600-foot-long barns are extinguished. "And in a minute, the tranquil scene—quiet barns, frogs peeping in a pond to the night sky—is shaken into screeching, roaring chaos," as the men move into the barn clapping their hands and shouting to make room for a forklift with a five-foot cabinet of cages.[11] When the forklift drops a box of plastic cages, the men crouch to a group of cornered chickens, groping for their legs, trying to grab in each hand one leg each of four or five birds who desperately fight back, wildly flapping their

wings and pecking. For this they get their heads bashed against the ground.[12] When a catcher thinks he has the right number of chickens in each hand, he pulls open a drawer in the cage and flings the birds in, pushing them down and shoving them into the back of the drawer. He stuffs in protruding body parts—wings, legs, heads—and slams the drawer shut. In three minutes, the drawers are full, and a forklift brings another empty cabinet. The work continues through the early morning light, until the house that held thirty thousand terrorized birds, so young that they would still have been sleeping warm under a mother's wings, is empty and silent.

A post-mortem examination in Britain of 1,324 broiler chicken carcasses of birds who arrived dead at the slaughterhouse found crushed skulls, presumed to have occurred when the drawers were closed. The investigators found abdominal hemorrhage and dislocated and broken hips, indicating that "catching and carrying large birds by one leg is conducive to dislocation of the hip, and that catching and carrying by two legs would help reduce this problem. Catching by two legs, however, would slow down the catching rate. . . ."[13]

Theoretically, the men are supposed to strive to reduce the bruises, broken bones, and smothering that result in lost profits; however, chicken "stuffers" are paid for speed, not gentleness. A former chicken "grower" writes, "By the dust-dimmed light of their flashlights, we watched as the crew hollered and yelled, trampling the frenzied birds indiscriminately. I will admit that I didn't always treat the birds with the greatest of gentleness, but I was sickened as birds were kicked and thrown across the darkened barn. We had to leave."[14] A reporter who stood shift with a crew remarked that the climate is not only frenzied and filthy, but angry." A crew leader stated, "All of this job is bad. . . . You hate the work."[15]

"Spent" laying hens are simply torn from the battery to the transport cages without regard to preserving "carcass quality." A former egg-industry worker in Britain says, "I

recall being shouted at for my gentleness. Birds were dragged from the cages by their legs. Four birds were carried in each hand end down, down the shed to the door. The noise was deafening, the smell was putrid. Legs, wings and necks were snapped without concern. . . . I gave up work in the poultry industry after bad dreams at night."[16]

Automated "Harvesting"

To reduce the bruises, broken bones, and other injuries from catching that result in market downgrading, and get rid of the labor problem, the broiler chicken industry has considered replacing manual catching with an automated catching machine, called a "poultry harvester," that looks like a giant street sweeper.[17] This 6-ton machine is claimed by the manufacturer to move "gently" through the chickens, scooping up 7,000 birds an hour with rubber finger-like projections that place them on a conveyer belt. The conveyer belt carries them into the machine where they are counted and sent to compartments. A computer opens empty compartments and shuts full ones, and when a crate is full, a forklift loads it onto the truck. This machine replaces a pneumatic, "vacuum cleaner" experimental model of the late 1970s in which birds were fed by hand into a funnel-like aperture and sucked through tubes to crates on a truck. The birds clogged inside the tubes and were spewed out.[18]

The industry is ambivalent about automated catchers. According to one critic:

> Chickens aren't going to line up in front of the counter rotating rotors with soft finger-like projections to be jostled into crates for The Final Journey.
>
> Instead, they're going to be spread out all over the broiler house, making a fuss.
>
> You would too if, suddenly, one end of your house opened up and there was this monster machine, 12½ feet wide, 24 feet long and eight feet high, with three giant rotating "claws" coming at you at speeds "up to 18 miles an hour."

"Realistically, under field conditions . . . it is expected the rate of harvest . . . will be 7,000 to 8,000 birds per hour."

Realistically, under field conditions, the chickens may never make it to the processing plant. They'll perish from fright on the broiler house floor.[19]

Transportation

It was found that half the birds that arrived dead at the plants had died from heart failure. . . . Presumably the physiological responses associated with the stress of catching, loading and transporting the birds had been too much for the cardiovascular system to cope with.[20]

A traumatic trip to the slaughterhouse follows catching. Ten to twelve chickens weighing four to five pounds each are forced to occupy three and a half feet of cage space.[21] Poultry transport, which can last anywhere from an hour to twelve hours or more, takes place in all kinds of weather in uncovered trucks, a harsh fact considering that the birds live indoors prior to catching. Clare Druce of Farm Animal Welfare Network states that "half-naked battery hens will feel cold winds, especially."[22] The started pullet business (specialized raising of young egg-type hens to become caged layers) has led to the trucking of young hens to the cage layer facility during winter months. According to Diseases of Poultry, "Unless crates are properly covered, exposure to wind and cold will rapidly cause freezing of unfeathered parts. The frosted appendage first becomes red and swollen, followed by gangrene, necrosis, and sloughing. After the appendage thaws, the bird experiences intense pain and does not eat."[23]

Stress and death among birds in transit are so common that the causes are being studied in laboratory simulations of transport. Spent laying hens have been shown "to experience a level of fear comparable to that induced by exposure to a high-intensity electric shock."[24] Truck vibration frequen-

cy impairs the birds' ability to regulate body temperature. Heat stress is a major problem in poultry transport and holding. Temperatures at 48-50 degrees Fahrenheit when the birds are loaded in the transport crates will climb to 55-60 degrees Fahrenheit in transit and up to 85 degrees Fahrenheit when a loaded truck stops for as little as an hour before unloading at the plant.[25] It is claimed that some heat stress problems could be immediately solved by attaching an air scoop to vehicles; however, this solution is rejected because scoops would increase wind resistance and drive up fuel costs. Imagine the suffering of chickens being trucked from, say, an egg farm in Arizona through the Arizona desert, "where temperatures even at midnight in the summer are over 100 degrees outside a vehicle, double that inside," to slaughter in California, at least an eight to nine hour trip.[26]

Even if some solutions to heat stress are eventually implemented, the birds' need for food, water, and rest will not be met. Rest would merely prolong the journey, and there is probably no feasible way to provide food and water for six or seven thousand birds in a truck.[27] In any case, food and water are deliberately withdrawn from broiler chickens from one to four hours before catching, in order to reduce intestinal splatter at the plant,[28] and from battery hens several days before catching, in order to save money.[29] Removal of food and water from birds prior to transport disrupts their gastrointestinal tract and impairs their immunity, increasing the number of birds infected with Salmonella ten times above the number of birds infected before catching.[30]

Truck Accidents

Trucks carrying thousands of chickens are liable to overturn on the highway. Thus, for example, on a freezing morning in January 1993, 5,000 chickens on the way to slaughter outside Portland, Oregon fell 50 feet from a highway ramp onto a parking lot when the truck carrying them hit a guardrail. Two thousand birds were killed instantly. The rest were

gathered up and sent on to the slaughterhouse. This event was treated as a joke by the local newspaper and the company.[31]

The accident that I became involved with occurred on August 24, 1995, when an 18-wheeler carrying 5,000 "spent broiler breeder" hens and roosters from North Carolina to a slaughter plant in New Jersey overturned on Interstate-95 in Springfield, Virginia crushing a thousand birds instantly.[32] Hundreds of crying, terrified birds covered the highway as crews roughly grabbed them by their wings and kicked them in front of TV cameras. Others sat locked in the jumbled crates in 90 degree heat, unable to move. Police said it was against the law to rescue the "merchandise." As a result, about half of the birds died of heat suffocation in the crates while waiting for the "owner" to arrive twelve hours later. Hundreds of others were given lethal injections during the night, just off the highway. Except for sixteen hens whom I and some other people surreptitiously rescued,[33] the rest were piled back on the truck when it arrived and sent to the slaughterhouse.

No Federal Regulations

There are no federal laws in the United States regulating poultry transport. The Animal Welfare Act excludes transportation of animals used for food and fiber,[34] and the 28-Hour Law of 1906 that requires animals in transit to be fed, watered, and rested every 28 hours is enforced only on trains and ships, not trucks.[35]

Shipment of Baby Chicks

One-day-old poultry can be shipped through the mail. Postal regulations require that the birds be delivered to the receiver within 72 hours of hatching with no provisions being made for food, water, or weather. Millions of baby chicks are delivered dying or dead each year.[36] Unclaimed birds may be left to die, or they may be suffocated in plastic bags, with the

possible addition of a shot from a fire extinguisher.[37]

In addition to being shipped domestically, millions of baby chicks are shipped in international transport, for example, from the United States to Asia and the Middle East. In U.S. laboratories, shipping conditions in trucks and planes are being simulated to "find out why many breeding chicks were not surviving the long journey to Asia."[38] An avian veterinarian explains the obvious: "The stress of improper housing, shipping and transport, malnutrition and water deprivation is directly responsible for the high mortality rate of chicks and hatchlings. There are numerous volumes of research papers to confirm this fact."[39]

Mass Transport Incompatible with Poultry Welfare

In Great Britain, The Welfare Of Animals During Transport Order of 1992 theoretically could enable local authorities to prosecute poultry transport companies for keeping poultry on lorries (trucks) for more than twelve hours at a time. Officers could point to a requirement in the legislation that birds must be given water every twelve hours. As birds stacked in crates cannot be given water, companies could not legally hold the birds for a period exceeding twelve hours. However, according to Farm Animal Welfare Network, the legislation, which was designed to placate European Convention lawmakers and the U.K. animal welfare movement, is worded in such confusing terms as to make it unlikely to bring about any improvement for poultry.[40]

The mass transportation of chickens is inherently cruel. As Compassion in World Farming states, as long as consumers demand the mass killing of chickens for food, these birds will "be manhandled, injured, covered in filth, hungry and thirsty and just plain terrified from the moment they are caught to the time of their death at the slaughterhouse."[41]

The Slaughter

> The memories of one Maryland chicken slaughterhouse will always be with me. It was summer, 90 degree heat, humid, no shade, and the chickens were in stacked crates. As we walked in, we were breathing the palpable stench of warm, dying bodies. It soaked through our clothes and skin. We took some birds out of the crates, and they tried to drink melting ice from our hands.
>
> Ingrid Newkirk[42]

In the summer of 1990 I stood outside the Perdue Farms chicken slaughter plant in Salisbury, Maryland, and watched the trucks, each one stacked with thousands of chickens, roll in and out all day. Across the street, people drifted in and out of McDonald's, some no doubt to dine, others just having dined, on Chicken McNuggets.

At the slaughterhouse, birds may wait in the trucks anywhere from one to nine hours depending on killing and processing speed. It is a throat-catching moment to look at a truck stacked with orange plastic crates that seem empty and all of a sudden see movement, or an eye in there, and know that experiences are taking place inside. Standing next to a truckload of chickens at a Tyson plant in Richmond, Virginia, I saw how agitated the birds became as they watched their companions being yanked by the legs and shackled by their ankles upside down on the moving conveyer belt.[43]

The killing of the birds normally involves three phases: motor paralysis by means of an electric current (inaccurately called "stunning"), throat-cutting, and bleeding. Poultry slaughtered in the United States are neither stunned (rendered unconscious) nor anesthetized (rendered pain-free). Pre-slaughter stunning of poultry is not required by law and is not practiced despite the use of the term "stun" to denote what is really immobilization by means of painful electric shocks. In practice, "stunning" is monitored only for efficient bleedout.[44]

Poultry Excluded from Federal "Humane Slaughter"

Law

The 1958 federal Humane Methods of Slaughter Act excludes poultry from its provisions.[45] The Poultry Products Inspection Regulations of the United States Department of Agriculture state only that "Poultry shall be slaughtered in accordance with good commercial practices in a manner that will result in thorough bleeding of the carcasses and assure that breathing has stopped prior to scalding."[46] The concern about breathing is not humanitarian but to prevent condemnations resulting from "redskins" produced when live birds enter the scald tank, and to prevent live birds from inhaling the contaminated scald water into which they are plunged after bleeding from the neck while hanging upside down in the bleedout tunnel. Every day in the United States, at least 30,000 to 60,000 broiler chickens enter the scald tank alive and breathing.[47]

Slaughter Without "Stunning"

Ritual and ethnic slaughter and many small operations ("small" meaning 20,000 or fewer birds slaughtered annually) omit "stunning," in order to save money, and because traditional and ritual slaughter excludes the practice. For example, Jewish doctrine states that an animal must be uninjured at the time of killing, and stunning is classed as injury.[48] The Vietnamese puncture a chicken's throat and let the blood drain out slowly.[49]

Undercover footage of a poultry slaughterhouse in Los Angeles shows chickens having their throats manually cut without first being electrically paralyzed and then being stuffed alive into bleeding holes in an idle manner by the employees. Blood-soaked chickens with partially cut throats try vainly to lift themselves out of the troughs into which more bleeding and writhing birds are casually flung before being picked up and shackled. Bleeding, flapping chickens fall off the line onto the floor—no one pays any attention.[50]

Pre-Slaughter Electrical "Stunning"

There are three main methods for immobilizing birds to prepare them for slaughter: (1) chemical immobilization, in which a mixture of gases is administered, such as carbon dioxide and reduced oxygen using an inert gas such as argon or nitrogen to stabilize and improve dispersal of the main gas; (2) mechanical, as by debraining, in which the medulla of the brain is pierced directly through the eye; and (3) electrical, in which a live current is shot through the bird by means of an electrified knife, plate, or electrified water to which sodium chloride (salt) has been added to improve the conductivity of the charge.

The electrified brine-water bath is the method that is used in the large commercial slaughter plants.[51] After the birds have been manually jammed into a movable metal rack that clamps them upside down by their feet, known as "live hang," about thirty seconds later their heads and necks are dragged through a 12-foot brine-bath trough called a stun cabinet for approximately seven seconds. Between 20 and 24 birds occupy this cabinet at a time. 180 or more birds pass through it every minute.[52]

The purpose of this method of stunning broiler chickens (and turkeys) is to relax neck muscles and contract wing muscles for proper positioning of the head for the automatic killers, prevent excessive struggling of the birds as the blood drains from their necks, promote rapid bleeding (under 90 seconds), and loosen feathers.[53] During electrical water-bath stunning, currents shoot through the birds' skin, skeletal breast muscle, cardiac muscle, and leg muscles causing spasms and tremors, reducing heartbeat and breathing, and increasing the blood pressure. The birds exit the stunner with arched necks, open, fixed eyes, tucked wings, extended rigid legs, shuddering, turned up tail feathers, and varying amounts of defecation.[54]

Problems identified with this method include birds missing the stun bath by raising their heads to avoid it, and shocking of birds splashed by water overflowing at the entrance end of the stun cabinet.[55] Electrical resistance of the

circuits can vary between and within a single slaughter plant reflecting differences in stunners and circuits, and a wide range of other variables including the birds' own bodies, like the amount of fat and skull density.[56]

Although the U.S. Department of Agriculture's Food Safety and Inspection Service (FSIS), in charge of federally inspected slaughter plants, claims that most birds under inspection are slaughtered "humanely," FSIS stated in 1992 that it did not have a list of humane methods of poultry slaughter or documentation verifying that most birds are rapidly and effectively rendered insensible to pain and suffering in the process of being killed.[57] Even if "most" birds are quickly desensitized, the two or three percent of conscious birds comprises millions of birds.

An example of a published FSIS study is "A Survey of Stunning Methods Currently Used During Slaughter of Poultry in Commercial Poultry Plants."[58] Cited at a Congressional Subcommittee hearing in 1994 as showing "widespread use of humane methods of slaughter in the Nation's [poultry] slaughter plants,"[59] this 1992 survey was conducted entirely by phone and fax!

Running an efficient pre-stun and kill line is a lot like painting a masterpiece. If you alter one color or one brush stroke, you affect the look of the entire scene and perhaps the desired result.[60]

In reality, so-called "humane" electrical stunning of poultry is regarded as incompatible with the goals of commerce. High levels of current are said to interfere with plant efficiency and to cause hemorrhage—a "bloody bird."[61]

Hemorrhaging of the fragile capillaries of the increasingly younger and heavier birds being slaughtered has been cited as a reason to lower the current levels even more.[62] Thus, while research suggests that for electrical stunning to produce unconsciousness chickens should receive a current of 120 mA per bird, and that currents under 75 mA per birds should never be used,[63] chickens slaughtered in the United States are being given weak currents ranging between 12 mA and 50 mA per individual bird.[64] This means that they are being painfully shocked and paralyzed, the opposite of

being rendered insensible to pain and suffering.

According to researchers, a major problem with electrical stunning, even under "ideal" conditions, is that birds who are stunned (rendered unconscious) and birds who are merely paralyzed look the same.[65] A bird or a mammal may be unable to move, struggle, or cry out, while experiencing intense pain and other forms of suffering including the inability to express outwardly a response to pain perception.[66] Even after decades of slaughter research in controlled laboratory experiments, disagreement exists on how to determine whether a bird is truly stunned and not merely immobilized (paralyzed) and whether a bird is in pain.

No one really knows the kind of pain and overall suffering involved. Various indicators have their proponents: visual, auditory, evoked versus spontaneous somatosensory, physical activity, brain waves, breathing, etc.[67]

British law requires that livestock and poultry must be rendered instantaneously insensible to pain until death supervenes. At least one scientist thinks that the law should delete the reference to pain and simply read, "Rendering the animal instantaneously insensible until death supervenes," because following electrical stunning one can have analgesia where there is conscious perception of non-painful but highly distressing stimuli including gagging, breathlessness, smell of blood, fear, and apprehension.[68] In other words, one can have dreadful experiences even without physical pain. Imagine the feelings of the chicken or turkey of whom it is recommended that "A good rule of thumb for checking for an adequate stun is to remove the bird immediately after stun and place it on the floor. The bird should be able to stand within 1-2 minutes."[69]

In Europe some companies have begun to stun chickens at amperages designed to cause cardiac arrest—a heart attack—in order to induce brain death prior to neck cutting and bleedout. Stopping the heart interrupts the flow of oxygenated blood to the brain resulting in a presumed loss of consciousness. Birds in a state of cardiac arrest may be further protected from the protracted agony of badly cut necks.

Notwithstanding, as one slaughter operator notes, "It is possible that the [electric] shock, even as it renders the bird unconscious, is an intensely painful experience."[70]

Post-Slaughter Electrical "Stunning"

In addition to pre-slaughter "stunning," post-slaughter electrical shocking of the still-living birds is being experimentally conducted and advocated by U.S. researchers claiming that while it will not improve bleedout, it will "calm [the bleeding and dying] birds and reduce the force required to remove feathers."[71] Post-slaughter stunning is now being used commercially. According to an article in Poultry Marketing and Technology, "Post-stunning is mostly used on broilers weighing more than 7 pounds, light and heavy fowl, and turkeys. It is also recommended for processors cooking product for frozen entrees."[72]

Thus, hanging and dying in the bleedout tunnel, after having their throats cut, the battered birds are guided automatically against an electrified ladder or a square plate and delivered a few final volts of electricity.[73]

Neck-Cutting

The two methods most commonly used for cutting the blood vessels in the necks of chickens are manual cutting, in which a knife is passed across the side of the neck at the joint with the bird's head, and automatic neck cutting, in which the bird's neck is glided across a revolving blade or between a pair of revolving blades.[74] Plants with automatic neck cutters may or may not have a manual back-up should a bird miss the cutter. Britain passed a 1984 law requiring manual back-up of automatic cutters.[75] However, there is no law in the United States.

The fastest way believed to produce brain death in chickens by neck-cutting is severing the two carotid arteries which supply the brain with most of its fresh blood, whereas the jugular veins carry spent blood away from the brain.

Poor neck-cutting extends the time that it takes a bird to die. Worst is the severance of only one jugular vein, which can result in a bird's retaining consciousness, while in severe pain, for as long as eight minutes. Most of the blood has to drain out of the body before the heart stops pumping blood to the brain through the carotid arteries. If both jugular veins are cut, brain failure occurs in approximately six minutes and the bird is in danger of regaining consciousness, especially if breathing is resumed. If both carotid arteries are quickly and cleanly severed, the supply of blood to the brain is disrupted, which is said to result in brain failure in approximately four minutes.[76]

Cutting the spinal cord is regarded as inhumane because it induces asphyxia—suffocation—rather than depriving the brain of blood, because the nerves that control breathing are severed within the spinal cord. Cutting the spinal cord interrupts the nerves connecting the brain with the bird's body making it impossible for the bird to exhibit conscious awareness through physical expression. Once again, the bird may be in excruciating pain or other distress without being able to show it.[77]

There is every reason to be concerned about the neck cutting procedures that are being used in the United States and elsewhere. Not only are various combinations of neck-cutting recommended on the basis of commercial utility, but ignorance is revealed. For instance, a contributor to the 1995 Centennial Edition of Poultry Tribune says that birds in earlier decades "would be slaughtered by cutting the throat, hopefully hitting the jugular vein."[78] Moreover, the carotid arteries are deeply embedded in the chicken's neck muscles (and even more deeply embedded in the turkey's), making them hard to reach.[79]

Ritual Slaughter

Ritual slaughter refers to "a method of slaughter whereby the animal suffers loss of consciousness by anemia of the brain caused by the simultaneous and instantaneous sever-

ance of the carotid arteries with a sharp instrument and handling in connection with such slaughter."[80] Contrary to assertions, ritual slaughter (e.g. Kosher, Muslim) does not ensure a "humane" death. Researchers at the Food Research Institute at Langford near Bristol in the UK showed that "in cattle brain activity sometimes persisted for some time after Shechita" (Jewish ritual slaughter), and that "sometimes the carotid arteries balloon within 10 seconds of being cut, causing an increase in blood flow to the brain, and so maintaining its activity."[81]

In practice, "ritual slaughter" may not even be used at some (perhaps many) ritual slaughter plants. For example, a New York State "Shopping Guide for the Kosher Consumer" (1987) says, "The shocket [orthodox Jewish ritual slaughterer] severs the windpipe and jugular vein."[82] Regarding handling, the British Farm Animal Welfare Council found that the demand for ritually acceptable birds "can lead to rejected poultry being left overnight in transport crates without food and water. Individual treatment, advanced as an advantage of religious slaughter, often meant in practice 'callous and careless' handling with birds being thrown or rammed into bleeding cones after their throats were cut."[83]

Spent Laying Hens and Small Birds

Spent laying hens and small birds such as quail and pigeons are not normally stunned in the United States. It is claimed that electrical stunning would incur a financial cost through carcass damage and rejection because of easily fractured bones.[84] Others have pointed out that while it is true that electrical stunning of hens causes broken bones (an average of two per bird), during the remainder of the processing they acquire an additional four broken bones per bird reflecting rough handling, inhumane housing, and the processing technology itself.[85] As spent laying hens are much older than broiler chickens when they are killed and consequently have harder skulls, they require stronger currents to be rendered unconscious, making the whole problem of "humane" elec-

trical stunning of these birds even more insurmountable.[86]

Gassing

In view of the problems with electrical stunning, an increasing number of researchers say that gas stunning based on hypoxia (low oxygen) with low levels of carbon dioxide and argon, or some other mixture of gases, represents the best alternative to current methods of pre-slaughter stunning of poultry. Gas, they say, would not only eliminate the need for pre-slaughter shackling; it would produce less carcass damage. It could be performed in the transport crates, thus saving the stress of removal and handling. Some say it is the only feasible method for spent laying hens.[87]

Yet, gas also has problems. For example, birds can "undergo undue aversive reactions since gas may irritate the respiratory system. It also has employee safety implications."[88] An article in Agscene, published by Compassion in World Farming in the United Kingdom, states, "Gas stunning will not lead to instantaneous insensibility to pain. . . . It could take up to 30 seconds for the birds to be properly stunned and during that time they could suffer. Moreover, chickens stunned with gas recover quickly—certainly before death could be induced by neck cutting. So the birds would have to be killed by the gas, not just stunned. Could that always be done in a busy slaughterhouse with a large throughput?"[89]

An article in New Scientist had a disturbing report on the use of gas by Ruth Harrison.[90] The author of the influential book Animal Machines and a member of the Farm Animal Welfare Council in Britain said, "I used to be very much a proponent of CO2 stunning." But a visit to a mink farm in Denmark, followed by subjecting herself to inhalation of various gas concentrations, changed her mind. She is concerned now about the gassing of day-old male chicks by the egg industry, which she once condoned. "In my opinion, it is no better than the old practice of filling up a dustbin with them and letting them suffocate."[91]

Treatment of Unwanted Male Chicks

Mass-suffocation has been the main method of killing male chicks. A 1995 article in World Poultry gives a further look at how the chicks of the egg industry are tortured and killed in laboratories and commercial hatcheries using methods ranging from heat and electricity to CO^2 to garden waste cutters to a "superior method . . . with fast rotating knives." The disadvantages of CO^2 from a humane standpoint are typically contrasted with the economic advantages: "The killing device is simple and affordable and the chicks stay unimpaired, so they can be sold to the pet-food industry (especially for cat food.)"[92]

Pain and Suffering in Birds

Chickens—birds—experience pain, fear and other forms of distress. Pain receptors, thermo-receptors, and physical-impact receptors responsive to noxious (tissue damaging) stimuli have been identified in birds and characterized in chickens. Like mammals subjected to painful stimuli, chickens show a rapid increase in heart rate and blood pressure, and behavioral changes consistent with those found in mammals indicating pain perception—efforts to escape, distress cries, guarding behavior, and the passive immobility that develops in birds and other animals subjected to traumatic events that are aversive and that continue regardless of attempts by the victim to reduce or eliminate them.[93] Michael Gentle states in "Pain in Birds" that comparing the physiological responses of the nociceptors (pain receptors) found in the chicken with those found in mammals, including humans, "it is clear that in terms of discharge patterns and receptive field size, they are very similar to those found in a variety of mammalian species."[94]

The Fight for "Humane Slaughter" Protection

With such views in mind, many animal protectionists in the United States have supported legislation to extend humane

slaughter coverage to poultry. California initiated legislation in 1991 by passing the first (and so far the only) "humane" poultry slaughter law in the United States.[95] Poultry are now amended into California's Humane Methods of Slaughter law requiring that animals killed for food must be rendered insensible to pain before slaughter. However, small birds and laying hens are excluded from coverage for the reasons cited above;[96] and in 1994, the California Department of Food & Agriculture arbitrarily [and probably illegally] invited ritual slaughterers to apply for an exemption to the regulations designed to implement the law.[97]

At the federal level, three bills were introduced in the U.S. House of Representatives in the early 1990s.[98] They sought to amend the 1957 Poultry Products Inspection Act to provide for the "humane" slaughter of poultry similar to how the 1906 Meat Inspection Act was used as a basis for determining the coverage of "cattle, sheep, swine, goats, horses, mules, and other equines" under the 1958 Humane Methods of Slaughter Act. However, all of these bills died in the House Agricultural Livestock Subcommittee to which they were referred.[99]

As a result, several animal protection organizations formally petitioned the U.S. Department of Agriculture on November 21, 1995, to use their statutory authority to extend humane slaughter protection to poultry through an amendment of the poultry products inspection regulations issued under the Poultry Products Inspection Act.[100] If the petition is granted, USDA inspection regulations for poultry will include a provision for the "humane" slaughter of poultry, similar to inspection regulations covering the "humane" slaughter of most mammals slaughtered for food each year in the United States.

It is inexcusable that the huge majority of nonhuman animals slaughtered for human consumption in this country are denied "humane slaughter" coverage. Cruelty prosecutions are impossible under these circumstances. The U.S. government and the poultry industry have no accountability regarding their treatment of the billions of birds they kill

while the birds are alive and capable of experiencing what is being done to them. The effort to extend coverage should not be regarded as a sanction for slaughter or a salve for conscience. Rather, the absence of a law conveys the false notion to the general public, and to those who work directly with poultry, that these birds do not suffer, or that their suffering does not matter, and that humans have no merciful obligation to them even to the nominal extent granted to cattle, sheep, and pigs.

At the same time, to those who say that vegetarianism will not come overnight, it can be said with even greater assurance that "humane slaughter" will never come at all, because the slaughter process is inherently inhumane, and the slaughter of the innocent is wrong, and because the poultry industry, even in countries where humane slaughter laws exist, is, for all practical purposes, ungovernable. Humane slaughter is an illusion. Rendering the slaughter process less inhumane is a possibility. A question is whether "humane slaughter" legislation for poultry will speed or delay the day when regarding a fellow creature as food is no longer an option.

Chapter 6
New Beginning

> With increased knowledge of the behaviour and cognitive abilities of the chicken has come the realization that the chicken is not an inferior species to be treated merely as a food source.
> Dr. Lesley J. Rogers, The Development of Brain and Behaviour in the Chicken[1]

The plea for ethical veganism, which rejects the treatment of birds and other animals as a food source or other commodity, is sometimes mistaken as a plea for dietary purity and elitism, as if formalistic food exercises and barren piety were the point of the desire to get the slaughterhouse out of one's kitchen and one's system. Abstractions such as "vegetarianism" and "veganism" mask the experiential and philosophical roots of a plant-based diet. They make the realities of "food" animal production and consumption seem abstract and trivial, mere matters of ideological preference and consequence, or of individual taste, like selecting a shirt, or hair color.

However, the decision that has led millions of people to stop eating other animals is not rooted in arid adherence to diet or dogma, but in the desire to eliminate the kinds of experiences that using animals for food confers upon beings with feelings. The philosophic vegetarian believes with Isaac Bashevis Singer that even if God or Nature sides with the killers, one is obliged to protest.[2] The human commitment to harmony, justice, peace, and love is ironic as long as we continue to support the suffering and shame of the slaughterhouse and its satellite operations.

Vegetarians do not eat animals, but, according to the traditional use of the term, they may choose to consume dairy products and eggs, in which case they are called lacto-ovo (milk and egg) vegetarians. In reality, the distinction between meat on the one hand and dairy products and eggs

on the other is moot, as the production of milk and eggs involves as much cruelty and killing as meat production does: surplus cockerels and calves, as well as spent hens and cows, have been slaughtered, bludgeoned, drowned, ditched, and buried alive through the ages. Spent commercial dairy cows and laying hens endure agonizing days of pre-slaughter starvation and long trips to the slaughterhouse because of their low market value.

In reality, moreover, milk and eggs are as much a part of an animal as meat is. No less than muscles, these parts comprise the physiological, metabolic, and hormonal activities of an animal's body. A hen's egg is a generative cell, or ovum, with a store of food and immunity for an embryo that, in nature, would normally be growing inside the egg. Milk is the provision of food and immunity produced by the body of a female mammal for her nursing offspring.

Historically, ethical vegetarianism has rejected the eating of an animal's body as this requires killing the animal specifically for the purpose of consumption. The ethical vegetarian regards killing an unoffending creature simply to satisfy one's palate and fit into society with revulsion. Premeditating the premature death of an animal is also disdained. Plutarch mourned that "But for the sake of some little mouthful of flesh we deprive a soul of the sun and light, and of that proportion of life and time it had been born into the world to enjoy."[3]

Many people believe that the degradation of other creatures is an inherent feature of using them for food. The animals are dominated by humans. Their food is chosen, their social, familial, and physical environment is controlled, their reproductive organs and activities are manipulated, and the length of their lives is determined by humans.[4] They can be abused at will based on economic "necessity," as when it becomes "necessary" to deprive one's hens of food for days, and even weeks, in order to manipulate egg production.[5] Even with laws, one has to ask realistically how they can be enforced. How does one stop the cruelty that falls under the heading of "standard agricultural practice"?[6]

In nature, animals exist for their own reasons, not only for others' use. In production agriculture, animals are brought into the world solely to be used. Any happiness they may enjoy is secondary to their utility and dependent upon the "permission" of their owner, who has complete jurisdiction over their lives, including the right to kill them at any time. Those who desire to end this arrangement, but feel they must detach themselves from it by stages, should begin by eliminating dairy products, eggs, poultry, and fish from their diet, because the cruelty embodied in animal products is compounded by the number and longevity of animals used to produce these particular products.

Only consider how many people now eat two or three chicken breasts at a single meal, or several wings as a snack, or the fact that dairy cows and battery hens are tormented not only for months but for years before being slaughtered. The countless numbers of fish killed each year for human consumption are not even measured in terms of individuals but in terms of metric tons.[7] Fish are increasingly being raised in factory farm aquariums as a result of human overpopulation and water pollution. They are being subjected to genetic engineering, forced rapid growth, drugs, and diseases of confinement, making them, in the most ultimately gruesome sense, "the chickens of the sea."[8]

The "Free-Range" Chicken

A growing number of people are looking to "free range" as an alternative to factory farm products. "Free range" conveys a positive image of drug-free animals living outdoors, as nature intended. Historically, the term "range" meant that, in addition to living outside and getting exercise, the animals could sustain themselves on the land they occupied. However, this is no longer the case. Birds raised for meat in the United States may be sold as "range" if they have USDA certified access to the outdoors.[9] No other criteria—vegetation, range size, number of birds, or space per bird—are defined by the Food Labeling Division of the Food Safety

and Inspection Service of the U. S. Department of Agriculture, which reviews and approves labels for federally inspected meat products.[10] A USDA staffer told me, "Places I've visited may have just a gravel yard with no alfalfa or other vegetation. The birds can exercise, but cannot range—that is, sustain themselves."[11]

The amount of exercise most of these "meat" birds get, even so, is small. The owner of "Rocky the Range Chicken," in Oregon, told me his chickens each get two and a half square feet of space, whereas USDA recommends only a foot and a half.[12]

Nor do USDA regulations have anything to say about keeping the range fresh. In reality, the area may be nothing but a mudyard saturated with droppings and intestinal coccidia and other parasites. Chickens spend much of their time close to the house, scratching, dustbathing, and wearing away the grass. A static house and pasture become unsanitary when thousands of birds are collected in a small area. A system of rotation is needed.

According to Compassion in World Farming, "An ideal free range unit is made up of a number of small insulated, movable houses each holding up to 300 hens with a littered floor. The houses can be moved to fresh ground on the link-arms of the tractor, giving the hens constant access to clean grass."[13]

While this system is ethically and ecologically superior to the battery cage system and to what is normally promoted as free range in the United States, it does not solve the problem of the unnatural isolation of the birds from other sexes and age-groups of their species and from other species.

Chickens enjoy the company of other creatures and get along well with them. They exchange benefits. Holly Cheever has described the arrangement that exists between Rafe, her horse, and her Rhode Island Red hen, Aurora: "She has learned that an excellent source of flies in the summertime is our horse's belly, where flies love to cluster and feed. She squats directly beneath our gelding, waiting for a fly to land, and hops up to snatch it with unerring accuracy. Not

only does she never miss her target, she doesn't even touch Rafe's sensitive abdomen which would prompt him to kick up at his underbelly, no doubt injuring her in the process. There is something particularly amusing about the stance she assumes before the strike which reminds me of a pro basketball player's body english as he goes for a rebound."[14]

This is life on a hobby farm, but when we turn to look at commercial free-range eggs, the idyllic image fades. Eggs produced and sold in the United States may be falsely advertised as "range," because there is no definition of husbandry terms regulating the sale of eggs in this country. The National Supervisor of Shell Eggs at the U.S. Department of Agriculture administers a voluntary program in which producers can use the USDA grade mark if the eggs have been packaged under USDA supervision.[15] However, there are no standards governing the term or the claim "range" or similar advertisements on egg cartons, such as "free running," "free roaming," or "free walking" on egg cartons. Thus, a Food and Drug Administration (FDA) staff member told me that a Minnesota egg producer can claim that uncaged hens kept on a concrete floor without nest boxes are free walking.[16]

According to the FDA staffer, free-range claims could be illegal under the Nutrition Labeling Education Act, which requires that nutrition information be stated so that consumers can understand it in the context of the total daily diet. It is possible also that under the Federal Food, Drug, and Cosmetic Act, a case could be made that birds are being kept in a way significantly different from what people expect. People presume free range birds spend much or most of their day outdoors with ample space, exercise, sunlight, social life, and at least some sustainable vegetation. To U.S. producers, however, free-range birds are simply uncaged: their "range" normally consists of the crowded floor of a building with nest boxes along the walls. In reality, most free-range producers try to stuff as many birds as possible into the least amount of space.

An example of what passes as free range in the United States is a brand of eggs sold under the name of "The Happy

Hen." The hens are advertised as "free running in a natural setting [and] humanely housed in healthy, open-sided housing, for daily sunning—something Happy Hens really enjoy."[17] Three Happy Hen houses are perched on remote Amish contract farms in Logantown, Pennsylvania. "Humanely housed" inside these long barns are 6,800 hens and one rooster for every 100 hens.

As we drove up to one of these houses on a beautiful June day, we saw a sea of chicken faces pressed against the netting of a building in the middle of grass and woods they never set foot in.[18] Inside, the birds were wall to wall. They were severely debeaked. Their feathers were straggly, drab, and worn away. When we commented on the terrible condition of the hens' feathers, the owner bragged, "We have a saying: 'The rougher they look, the better they lay.'"

NEST EGGS, which are marketed by Food Animal Concerns Trust (FACT) in Chicago, are probably produced by the least inhumane mass production operations one is likely to find in this country. To qualify for NEST EGGS packaging, marketing, and promotion, farmers must keep their hens uncaged in a building equipped with nest boxes, deep litter, feeders and drinkers. Farmers are encouraged to provide fresh bales of hay and to sprinkle around some cracked corn, whole oats or calcium grit each day to encourage the hens to scratch and to keep the litter in good condition. They are advised (but not required) to provide each hen with 2 square feet of space. "Careful" debeaking is permitted. Forced molting is prohibited.[19]

Chickens can live active lives for up to 15 years,[20] but after a year or two commercial free-range hens are hauled away in transport crates the same as battery hens, (Noncommercial family farms generally keep their "girls" two or three more years before replacing the entire flock.) Spent fowl, whether caged or free-range, go to the highest bidder, usually a spent-fowl slaughter plant or a live poultry market or auction. "The Happy Hen" hens are trucked to live poultry markets in Pennsylvania, New Jersey, and New York City where they fetch a dollar per bird. (Spent-fowl

plants pay 2 to 25 cents per bird.)[21]

Even if free-range eggs were the humane alternative people would like to think they are, the problem of "excess" roosters would remain. Apart from a small number of males used to replenish the flocks, roosters have no value in egg production. Therefore, the brothers of the free-range hens—like the brothers of the battery hens—are trashed at birth or sold to laboratories,[22] "Easter" chick peddlers, and pet stores.[23] No amount of advertising can change this fact.

See for Yourself

> Only oppressors can deny the importance of suffering to the individuals who suffer or who respond to that suffering.
> Carol J. Adams and Marjorie Procter-Smith[24]

People should visit as many farm animal confinement systems as possible to see for themselves what goes on. When visiting a battery hen complex, they should ask to see the "old" or "spent" hens who have been locked up for 7 or 8 months or more, churning out eggs. Otherwise the management will show you only the newly installed hens who have not yet lost most of their feathers and become covered with raw sores. Tell them you want to see hens who are being force-molted. If starving chickens for profit is a morally legitimate practice, it should be open to public inspection.

When you visit, look at the faces and eyes of the animals and observe their body language. Notice their voices. The idea that human beings cannot logically recognize suffering in a chicken, or draw meaningful conclusions about how a human would react to the conditions under which a caged hen lives, is ridiculous. There is a basis for empathy and understanding in the fact of human evolutionary continuity with other creatures that enables us to recognize and infer, in those creatures, experiences similar to our own. The fact that animals are forcibly confined in environments that reflect human nature, not theirs, means that they are suffering

much more than we know in ways that we cannot fathom. If they preferred to be packed together without contact with the world outside, then we would not need intensive physical confinement facilities, and mutilations such as debeaking, since they would voluntarily cram together, live cordially, and save us money. The egg industry thinks nothing of claiming that a mutilated bird in a cage is "happy," "content," and "singing," yet will turn around and try to intimidate you with accusations of "anthropomorphism" if you logically insist that the bird is miserable.

Michael W. Fox states that we cannot argue that the more domesticated an animal is, the less freedom the animal needs, because domestication is more a change in the relationship between the animal and the environment than within the animal. If this were not the case, "then highly domesticated dogs, pigs and battery-caged laying hens would not have the capacity to become feral and, when given the opportunity, express the full range of behaviors that their wild counterparts possess. Domesticated animals can differ greatly in size and shape from their wild relatives, but they differ little in terms of their behavioral repertoires."[25]

One method that we use to assuage our guilt about the way we treat farm animals is to plead that, having no basis for comparison, they cannot know that their lives are desolate. We might as well use this plea to absolve ourselves of responsibility towards anyone in the world who, we decide, because they have never known anything but misery, "cannot know that their lives are desolate." Are we prepared to say that babies who are born junkies as a result of their mother's habit, having no basis for comparison, cannot know that their lives are desolate? Is this an acceptable argument for children born into slavery? Even if this were so, where does such thinking constructively lead?

As a matter of fact, animals do "know," because knowing is an organic process far deeper than words and concepts can express. Every bodily cell is a repository of experiences including memory and expectation as elements of a particular moment in the life of that particular cell. The look in a

creature's eyes tells us a whole lot about what he or she "knows." Freedom and well-being, as Fox observes, "are more than intellectual concepts. They are a subjective aspect of being, not exclusive to humanity, but inclusive of all life. This is not an anthropomorphic claim. It is logically probable and empirically verifiable."[26]

It is remarkable how far a person may go in order to justify the exploitation of other creatures. An example is the poultry researcher who said that if he thought that [other] animals had a concept of the past and the future, he would be a vegetarian.[27] He proposed that the ability to conceptualize the past and the future should be accepted as the morally relevant difference between other living beings (their intrinsic and ultimate worth) and ourselves. In fact, we do not know that other animals lack this ability; we merely assume (and perhaps hope) they do. But if they do, so what? Are we justified in saying, "You lack the ability to form a concept of the past and the future; therefore I have a right to kill you"?

As for humans, we have, at best, an ambiguous relationship to the past and the future, both morally and conceptually. As well as seeing some things clearly, human beings constantly reinvent the past, and fabricate, in their minds, an idealized future, both consciously and unconsciously, for good and for evil. There is excellent evidence that we humans have a very poor memory of our own past conduct. How many millions—billions—of people have been murdered in the name of the "past" and the "future"? Even if other kinds of animals do experience the past and the future differently from the way we do, their activities, and their responses to new as well as to familiar situations, show that, like us, they anticipate, plan, and remember. It is precisely on such grounds that an avian physiologist has condemned the battery cage system for laying hens, charging that "In no way can these living conditions meet the demands of a complex nervous system designed to form a multitude of memories and to make complex decisions."[28]

If the ability to remember is a basis for determining a

creature's right to be or not to be, then what do we do about all those people (including ourselves) whose sense of their own past excludes a vicarious identification with their victims? Carol J. Adams and Marjorie Procter-Smith said that "The voice of the voiceless offers a truth that the voice of the expert can never offer: It offers the memory of suffering and the truths of subjugated knowledge."[29] This memory and these truths comprehend a totally different past from the past of the experts.

Cruel Experiments

The decision to consume animal products involves one morally with millions of animals beyond those being used strictly in food production. Huge numbers of chickens and other farm animals are subjected to painful and degrading experiments on behalf of the food industry each year. Their status as flocks and herds ensures that vast numbers will be used up in agricultural experiments simulating commercial production situations.

In 1988, a Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching was published based on the 1985 edition of the Guide for the Care and Use of Laboratory Animals published by the National Institutes of Health (NIH).[30] It was developed in response to policies of the U.S. Public Health Service's Office for Protection from Research Risks that went into effect in January 1986, which resulted in the inclusion of agricultural animals used in agricultural research and teaching in many institutions' animal care and use programs for the first time.

The equivocation of the Guide is evident in the fact that while professing to encourage scientists to continue seeking improved methods of farm animal care and use, the authors "accept" procedures that "may cause some temporary discomfort or pain" if these are standard commercial practices "warranted in Context of agricultural production."[31] This leaves the door wide open; while the proviso that painful and otherwise distressful experiments should be "per-

formed with precautions taken to reduce pain, stress, and infection"[32] is undermined by the fact that normal agricultural experiments on live chickens and other farm animals are either deliberately designed to produce pain, stress, fear, and infection, or else they cannot be performed without producing these conditions. An insolent cruelty operates. A researcher told me that shaving hens naked with sheep shears in heat-stress studies was "very humane . . . just like a haircut."[33]

Those wanting an idea of the kinds of experiments that are regularly conducted on chickens, turkeys, ducks, and other domesticated fowl in the United States should consult the pages of Poultry Science, Journal of Applied Poultry Research, and the USDA bibliographical series publication, "Stress in Poultry: January 1979—August 1990." The nadir that can be reached by researchers and others as a result of society's detachment from the fate of farm animals, aided by our unquestioning acceptance of what we have been taught to revere as "science," is sickening to contemplate. Moreover, countless atrocious experiments are conducted that are never even published.

To illustrate the kinds of things that are done to hens in the name of egg production, let us look at three examples. In a study published in Poultry Science in 1984, foreign materials (inflated balloons, shell membranes and tampons) were inserted into the uteri of hens and anti-inflammatory and immunosuppressive drugs were used to determine possible causes of shell-less eggs, a multimillion dollar loss to the egg industry.[34] "Inflated balloons that resembled eggs in size and shape were manually inserted into the uteri. Shell membranes (taken from eggs in the oviduct of SCWL control hens prior to shell calcification) and Rely (regular size, Proctor and Gamble, Cincinnati, OH) and Kotex (regular size, Kimberly Clark Corp., Neenah, WI) tampons were inserted into the uteri using the Rely applicator. Playtex tampons (Playtex Plus, International Playtex Inc., Dover, DE) were inserted into the uteri using the Playtex applicator. These foreign materials were inserted into the uteri of hens at

oviposition (Experiment 1) and immediately after noncalcified eggs were manually removed from the uteri (Experiment 2)."[35]

The presence of the foreign shell membranes and tampons in the hens' uteri caused high fever, vomiting, diarrhea, and death. "The balloons were the most difficult of all the materials to insert into the uteri. If a hen had not accepted the balloon after it had been inserted into the uterus 3 or 4 times, the bird was not used. A punctured uterus was believed to be the cause of death of one hen in this group. In most cases the materials remained in the uteri from 1 to 48 hr. In one instance, a Rely tampon was expelled within 1 hr, but the bird still died. In other cases, tampons or balloons remained in the uteri overnight and were sometimes enclosed in shell membranes. Some treated [noncontrol] hens died within 8 hr; however, most hens died between 14 to 48 hr after insertion."[36] The researchers concluded that the hen's reproductive system might serve as a model for studying human toxic shock syndrome.

In a study published in the Journal of Applied Poultry Research in 1992, researchers removed all food from caged hens to observe the effects of 10 or 14 days "fasting" followed by 18 or 14 days respectively of cracked milo or a conventional layer diet on subsequent performance.[37] They concluded that egg production and profit "favored the 14 days fast plus cracked milo treatment over the 10 days fast plus cracked milo treatment by 6.4 eggs and $.22 per hen-housed, respectively." They noted that "Fasting periods can range from 5 to 18 days, but the use of these extremes should be examined carefully and economic considerations should be part of any such analysis."[38]

In the same issue, a researcher at Perdue University published his experiment on the "Effect of Red Plastic Lenses on Egg Production, Feed per Dozen Eggs, and Mortality of Laying Hens."[39] The hens' eyes were fitted with red contact lenses. "Seven hundred and ninety Dekalk L pullets, 10 weeks of age, were obtained from a local hatchery. Beaks of all pullets [young hens] had been trimmed at day one by

using a hot blade; non-trimmed pullets were not available at that time." The hens were divided into three caged groups including hens with no lenses, hens with lenses inserted at twelve weeks old, and hens with lenses inserted at sixteen weeks old.

At 17 weeks old, the hens were moved from the caged-pullet house to the caged-layer house. According to the researcher, "Considerable mortality occurred among birds with lenses between 2 and 8 weeks after moving the birds to the layer facility. Mortality was attributed to an inability of the birds to find the feed."[40] He concluded with recommendations that contact lenses not be inserted before moving birds from the caged-pullet house to the caged-layer house unless food and water are placed in the same location in both houses; that the problem of the inability of the lensed hens to find the food in the trough (and thus starve to death in the cage) might be corrected by putting the birds in the cages first and inserting the lenses later; and that the use of lenses that are not as dark as those used in his study should enable birds to see sufficiently to find food and water in a dimly lit house. He noted that a lens of this type is being developed by a company called Animalens, which claimed that the use of contact lenses contributes to reduced feed usage by decreasing feed consumption, bird activity, or both. Animalens funded this research on what the president of the company kiddingly referred to as "chicken goggles."[41]

In 1991, I undertook to investigate the use of permanent red contact lenses in laying hens after having received two written complaints from employees in the poultry unit at California Polytechnic State University, in San Luis Obispo.[42] The employees charged that a lens experiment on caged hens sponsored by Animalens was causing severe eye infections, abnormal behavior, and blindness, and preventing the hens from closing their eyes normally because the lenses were so large. The hens were "pecking the air" and "rubbing their eyes repeatedly on their wings."[43] The Animalens trainers who inserted the lenses did not even bother to wash their hands.[44]

An article in the school newspaper noted that the lens-

es—made of cheap, non-gas permeable materials that prevented the hens' eyes from breathing—had caused severe infections in the hens' eyes that worsened with time, and that those working with the hens were discouraged from helping them, in keeping with commercial practice, because, according to a student, "it's just not profitable to spend time treating the infections. What's taught in class is the less time you handle these birds, the more money you'll make."[45] The photograph that accompanied the article showed a severely debeaked hen whose left eye appeared to have dissolved under the lens. The hens received no veterinary care or treatment during or after the experiment. They developed painful corneal ulcers and blindness and were left to languish with the lenses in their eyes for months in the poultry unit. United Poultry Concerns and a local organization, Action for Animals' Rights, sought in vain to persuade the university to place the remaining hens—at our expense, not theirs—with a veterinary ophthalmologist who offered to give them a permanent home.[46]

A year after the complaints were issued, a local newspaper reported that the surviving hens were being sold "one by one, mostly to individuals who take them home for slaughter."[47] University officials announced that in the future, experimental protocols that "depart from standard agricultural practice," or that "may pose a threat to animal welfare," would be referred to the University Animal Welfare Committee for review.[48] Even though this proposal had not been legally required to be submitted for review, because the university was not then receiving funds from the U.S. Public Health Service, if it had been submitted, it would have been approved. In retrospect, the university called this study consistent with the university's principle of "learn by doing."[49]

No Federal Protection

These hens were morally abandoned by an educational institution in a society in which so-called "food" animals have historically been abandoned. Thus, farm animals were

excluded from the definition of "animal" under the Federal Animal Welfare Act, which was designed to "protect" certain warm-blood animals used in nonagricultural—biomedical and basic—research (as opposed to agricultural resear***ch,***

remains how far the law can protect a creature whom it has defined in advance as a piece of property, a thing without rights which the lawmakers have appointed themselves absolute jurisdiction over.[57] A wag asks what difference it makes how chickens are raised, since they are going to end up on a plate anyway. "I pointed this out to the waiter. He said, 'All of our chicken is free-range.' And I said, 'He doesn't look very free there on that plate.'"[58]

The fact that giving chickens a decent life before killing them can be seriously ridiculed is a clear reason to stop raising them for food. It is not that they are going to die anyway that seems to justify our abuse of them when they are alive, because death is the fate we all share and we do not generalize the argument, but that we are deliberately going to kill them. There is a felt inconsistency in valuing a fellow creature so little and yet insisting that he or she be granted a semblance of tolerable existence prior to execution. So wanton can our disrespect for our victims become under these circumstances that any churlish sentiment or behavior seems fit to exer*cise. It is contemptible to assert that humans have*

"food" invites a low standard of behavior towards them. It encourages us to "decide" that morality does not apply in their case, even though our treatment of our fellow creatures is intrinsically a matter of morality, including the decision to flout morality in order to practice science or produce food. The basic premise governing our relationship to "food" animals engenders guilt and rationalizations, even hatred and blame of our innocent victims, because we know, as Henry Spira has observed, that our victim's heartbeat is also our own. He asks, "What gives us the right to violate the bodies and minds of other feeling beings?"[61] We have a sneaking suspicion that we have no right. People who know and like chickens are reduced to deception and denial: "The first rule to remember if you plan on raising chickens for meat is never to name a bird you intend to eat! . . . If you name your future meal, call it Colonel Sanders or Cacciatore. Above all, try to take a lighthearted attitude toward the matter. It's the only way you'll be able to do your own butchering and keep your sanity."[62]

It is sometimes claimed in contrast to our own culture that traditional cultures believed that by eating a certain kind of animal they incorporated the animal's virtues and spirit. However so, the fact is that in our society, millions of people chomp on dead chickens, dead wings and leg stumps, and make crude chicken jokes, absurdly constituting themselves by the intimate act of eating beings and products from beings they call "dirty," and whom they despise.

Morally Handicapped Industry

Even so, the poultry industry and agribusiness generally worry that the public may eventually come to perceive them as morally handicapped, as indeed they are.[63] It is a sign of moral handicap to mutilate the mouth of a bird, cage her for life, and starve her for money. It is a sign of moral handicap to force chickens and turkeys to grow so big so fast that it is painful for them merely to stand on their feet. The poultry industry is not only cruel, but obscene. It isn't only the mas-

turbation and artificial insemination of "breeder" turkeys and (increasingly) chickens, ducks, and geese,[64] or the sticking of balloons and tampons in the uteri of laying hens and making them die a death that only a savage could conceive of. For thousands of years, human beings have violated the bodies and family life of birds and other living beings. We have reached the point where poultry researchers blandly assert, "We are no longer selling broilers, we are selling pieces. A knowledge of how broilers of different strains and sexes grow and become pieces is increasingly important."[65] Where do we go from here?

An engineer predicts that the future of chicken and egg production will go something like this. "Mature hens will be beheaded and hooked up en masse to industrial-scale versions of the heart-lung machines that brain-dead human beings need a court order to get unplugged from. Since the chickens won't move, cages won't be needed. Nutrients, hormones and metabolic stimulants will be fed in superabundance into mechanically oxygenated blood to crank up egg production to three per day, maybe five or even ten.

"Since no digestive tract will be needed, it can go when the head goes, along with the heart and lungs and the feathers, too. The naked headless, gutless chicken will crank out eggs till its ovaries burn out. When a sensor senses that no egg has dropped within the last four or six hours, the carcass will be released onto a conveyer, chopped, sliced, steamed and made into soup, burgers and dogfood.

"The apotheosis of egg production will have been reached. It's going to happen. It's probably already in the works."[66]

Depending on who we are, we will laugh or not laugh. When I see our chickens out in the yard sunning themselves, or tripping through the grass in their inimitable way, half running, half flying, or when I watch, as I never tire of watching, their ineffable balletic gestures, poses, poises, grace and wit displayed in the dramas of their society, even their anger with each other at times, I can hardly believe that what our society and our species is doing to them is real. I

contemplate the contemporary and futuristic fate of the hen, and compare this with the fascinating and winsome creature I know, of whom it has been tenderly written that she is "rich in comfortable sounds, chirps and chirrs, and, when she is a young pullet, a kind of sweet singing that is full of contentment when she is clustered together with her sisters and brothers in an undifferentiated huddle of peace and well-being waiting for darkness to envelop them."[67] In anguish, I wish that all the chickens of the world could be safely gathered together beneath her wings, in perfect and dreamless sleep.

References and Notes

PROLOGUE

1. William Kotzwinkle, Doctor Rat (New York: Avon Books, 1983), 28-29.
2. Karen Davis, "Viva, The Chicken Hen," Between the Species: A Journal of Ethics 6.1 (1990): 33-35.

Chapter One HISTORY

1. M.A. Jull, "The Races of Domestic Fowl," The National Geographic Magazine 51.4 (April 1927): 379.
2. John Woolman, The Journal and Major Essays of John Woolman, ed. Phillips P. Moulton (New York: Oxford University Press, 1971), 178.
3. Page Smith and Charles Daniel, The Chicken Book: Being an Inquiry into the Rise and Fall, Use and Abuse, Triumph and Tragedy of Gallus Domesticus (Boston: Little, Brown, 1975), 10, 31. See also Akishinonomiya Fumihito, et al., "One subspecies of the red jungle fowl (Gallus gallus gallus) suffices as the matriarchic ancestor of all domestic breeds," Proceedings of the National Academy of Sciences 91 (December 1994): 12505-12509.
4. Smith and Daniel, 33.
5. Smith and Daniel, 13.
6. Smith and Daniel, 74-75.
7. Smith and Daniel, 13.
8. Smith and Daniel, 14.
9. Andrew Johnson, Factory Farming (Oxford, UK: Basil Blackwell Ltd, 1991), 23.
10. Johnson, 23.
11. Keith Thomas, Man and the Natural World: A History of the Modern Sensibility (New York: Pantheon Books, 1983), 94-95.
12. Tobias Smollett, The Expedition of Humphry Clinker, ed. Lewis M. Knapp (London: Oxford University Press, 1966), 121. In this epistolary novel, the June 8th letter from which these comments derive tells a lot about how animals raised for food were treated in 18th-century society and about culinary habits in general.
13. Smollett, 119.
14. Thomas Hardy, Tess of the d'Urbervilles, vol. 1 of The Works of Thomas Hardy in Prose and Verse, 1912 (New York: AMS Press, 1984), 70.
15. Hardy, 68-69.
16. Hardy, 328.
17. Mark Mathew Braunstein, Radical Vegetarianism, Revised ed. (Quaker Hill, CT: Panacea Press, 1993), 93-94.
18. Joseph Ritson, An Essay on Abstinence from Animal Food, as a Moral Duty (London: Phillips, 1802), 216-217.
19. J. Hector St. John de Crevecoeur, Letters from an American Farmer and Sketches of 18th-Century America, ed. Albert E. Stone (Middlese, UK: Penguin Books, 1981), 55.
20. Molly Ivins, Molly Ivins Can't Say That, Can She? (New York: Random House, 1991), 167.
21. Henry S. Salt, Seventy Years Among Savages (New York: Thomas Seltzer, 1921), 130-131.
22. Harry R. Lewis, "America's Debt to the Hen," The National Geographic Magazine 51.4 (April 1927): 453. American Poultry Historical Society, American Poultry History 1823-1973, ed. John Skinner (Madison, WI: American Printing & Publishing, 1974); see esp. 184. Broiler Industry July 1976; see esp. 119. The

Poultry Tribune Sept. 1995; see esp. 6.
23. Peace Corps Information Collection and Exchange, Practical Poultry Raising Manual M-11 (Washington, DC: Transcentury Corporation, 1981), 7-8. See also Atul Shah, "Poultry Farms or Concentration Camps," Animal Citizen (The official organ of the Animal Welfare Board of India) 29.2 (Oct./Nov./Dec. 1993): 32-34.
24. "How it was way back when," Broiler Industry July 1976: 94.
25. Smith and Daniel, 244.
26. W.O. Wilson, "Housing," American Poultry History, 218.
27. George Watts and Connor Kennett, "The Broiler Industry," The Poultry Tribune Sept. 1995: 6.
28. Watts and Kennett, 6.
29. J.H. Florea, "Education," American Poultry History, 75.
30. Florea, 75.
31. Florea, 67.
32. W.M. Insko, Jr., "Reproduction," American Poultry History, 153.
33. Florea, 61.
34. Florea, 82-83.
35. Don Cameron Warren, "Breeding," American Poultry History, 254-255; Smith and Daniel, 270-272.
36. E.g., from the 1980s to 1994, Tyson Foods, Inc. and Upjohn Co. owned Cobb-Vantress Inc., a supplier of broiler breeding stock. In 1994, Tyson acquired UpJohn's share (Feedstuffs Aug. 29, 1994: 7). H & N International, a primary egg-laying poultry breeder, is owned by The Lohmannn Wesjohann Group comprising "Livestock and poultry breeding, animal and poultry nutrition, pharmaceuticals, livestock and poultry housing and equipment and environmental control systems, chick production and marketing of poultry products" (brochure). In 1974, Merck and Co. a global pharmaceutical company, acquired Hubbard Farms, a broiler breeder operation. "Hubbard operates within the Merck AgVet Division, which markets a variety of animal health and crop protection products worldwide." Hubbard Farms poultry genetics research is supported by Merck Research Laboratories. In 1978, Merck acquired British United Turkeys Limited (B.U.T.), a global turkey genetics operation ("Hubbard Farms," The Poultry Tribune Sept. 1995: 72).
37. Mack O. North and Donald D. Bell, Commercial Chicken Production Manual, 4th ed. (New York: Van Nostrand Reinhold, 1990), 1-11. See also Smith and Daniel, 280.
38. Wilson, 218-247. He notes, "World War II increased the demand for eggs and poultry, but held back development of the cage system through shortage of metals" (222-223).
39. Wilson, 227.
40. John L. Skinner, "Breeds," American Poultry History, 45-47.
41. J. Frank Gordy, "Broilers," American Poultry History, 382-385. Watts and Kennett, 12.
42. Kim Clark, "Chicken manure fouls the bay," The Sun (Baltimore) March 21, 1993: 5B. Steve Marbery, "Growth in broiler product fuels company-grower tension," Feedstuffs, Aug. 7, 1995: 9. For a continuing account of poultry growers' viewpoint, see Poultry Grower News; published 6 times a year by the National Contract Growers Institute, P.O. Box 824, Ruston, LA 71273.
43. "A First: Growers Launch National Organization!!" Poultry Grower News 8 (December 1991): 1-2.
44. Rod Smith, "Broiler production continues expanding outside the 'Belt,'" Feedstuffs Aug. 13, 1990: 6. Martha Quillin, "Bills back poultry growers," The News & Observer (Raleigh, NC) March 11, 1993: 3A.
45. Derrick Z. Jackson, "On the chicken line, people are treated like animals,"

Boston Sunday Globe Dec. 1, 1991: A27.
46. Wilson, 245.
47. JoAnn Farb, letter to the author, Aug. 26, 1993.
48. For examples of such attitudes, see John Podhoretz, "Of all the chicken-hearted, dumb . . ." The Washington Times April 4, 1991: E1, E5; and the statement of John Schwartz, an extension service director, in Daniel C. Church, "A question of the chicken and the egg," The Intelligencer (Doylestown, PA) Sept. 5, 1995: A1.
49. M[ichael]. W. Fox, "Animal Freedom and Well-Being: Want or Need," Applied Animal Ethology 11 (1983/1984): 209.
50. Barbara Noske, Humans and Other Animals: Beyond the Boundaries of Anthropology (London: Pluto Press, 1989), 18.
51. United Egg Producers, Healthy, Productive Management Practices of the U.S. Egg Industry (Decatur, GA, n.d.).
52. F. Wemelsfelder, "Animal boredom: do animals miss being alert and active?" Applied Animal Behaviour: Past, Present and Future, ed. M.C. Appleby, et al. (Potters Bar, Herts, UK: United Federation for Animal Welfare, 1991): 122.
53. Lesley J. Rogers, The Development of Brain and Behaviour in the Chicken (Wallingford, Oxon, UK: CAB INTERNATIONAL, 1995), 219.
54. J. Baird Callicott, "Animal Liberation: A Triangular Affair," Environmental Ethics 2 (1980): 335.
55. Robert Burruss, "The Future of Eggs," The Sun (Baltimore, MD) Dec. 29, 1993: 16A.
56. Debbie Behr, personal communication to the author.

Chapter Two THE BIRTH AND FAMILY LIFE OF CHICKENS

1. Mary Gage, Praise the Egg (London: Angus & Robertson Publishers, 1981), 11.
2. Smith and Daniel, 321.
3. Rodney E. Leonard, "Animal Rights Concerns Show Media Savvy, Naivete," Nutrition Week (Community Nutrition Institute) March 15, 1991: 1.
4. United Poultry Concerns, Mourning Vigil Scheduled To Commemorate Chickens Raised For Food, March 1991.
5. Leonard, 1.
6. Insko, 140.
7. Insko, 141.
8. "Gordon Johnson Remembers," Broiler Industry July 1976: 119-120.
9. "Chick Master: More than 55 years of product innovation, customer support," Poultry Tribune Sept. 1995: 54.
10. Insko, 149-150.
11. Diane Miller, Queens County Farm Museum (Floral Park, NY), telephone interview with the author, Dec. 22, 1994.
12. Esther Friedman (special education teacher trainer, New York City Public Schools), telephone interview with the author, Dec. 22, 1994.
13. See, e.g., "Preserving Chick Embryos," Japanese Quail (Coturnix) 4-H Research Incubation Embryology Project, Clinton Twp., MI: Macomb County Michigan State University Extension, n.d., 48; Helen Ubinas, "Hatching Responsibility," The Hartford–Courant Jan. 28, 1996: H4.
14. D. Miller; Friedman.
15. North and Bell: "In all probability the ratio of males to females is nearly equal at the time the ova are fertilized (primary sex ratio), but unequal mortality during embryonic development usually causes a varying preponderance of males over females at the time of hatching (secondary sex ratio)" (105).
16. "Chickens Aren't the Only Ones," Reading Rainbow, prod. Lancit Media Productions for Great Plains National/Nebraska ETV Network and WNED-TV,

Buffalo, 1987 (30 min).
17. "Pignews: Chickens and Pigs," 3-2-1- Contact, prod. Children's Television Workshop for PBS, 1985-1986 (30 min.).
18. Rene Descartes (1596-1650) was a French philosopher and mathematician who argued that nonhuman animals are mindless, unfeeling machines.
19. Smith and Daniel, 166.
20. Smith and Daniel, 184.
21. In Plato's Symposium, Aristophanes explains Love by imagining that the primeval human after being divided in two, "came together, and threw their arms about one another eager to grow into one."
22. Smith and Daniel, 184-185.
23. Smith and Daniel, 184.
24. Smith and Daniel, 272.
25. Wilson, 234-235.
26. A. William Jasper, "Marketing," American Poultry History, 367.
27. Quoted in Smith and Daniel, 160.
28. Matthew 23:37; quoted in Smith and Daniel, 161.
29. Smith and Daniel, 162.
30. Letter-essay to the author, Oct. 29, 1990.
31. Christine Nicol and Marian Stamp Dawkins, "Homes fit for hens," New Scientist March 17, 1990: 46.
32. Geoffrey Chaucer, The Nun's Priest's Tale, The Canterbury Tales, The Portable Chaucer, ed. Theodore Morrison, Revised ed. (New York: Viking Penguin, 1975), 189.
33. North and Bell, 45.
34. Smith and Daniel, 53.
35. Smith and Daniel, 65.
36. Smith and Daniel, 216.
37. David Sullenberger, "Lighting for Winter Egg Production," TimeWarrior Farm Chronicle C20 (Anthony, NM, 1994) 2. See also Rogers: "Chickens have well-developed vision with spectral sensitivities ranging from the infrared to the ultraviolet regions of the spectrum, and much of this visual capacity is known to develop before hatching" (27).
38. Sullenberger, "Roosters: Who Needs 'Em Anyway?" C14, (1993), 6: "Sight is of limited value in the dense cover of a jungle especially in regard to knowing where one is in relation to the other members of the flock. Sound, however, works very well in dense cover. Enter the crow!" See also Rogers: "As the chick embryo begins to respond to sound from as early as day E[embryonic age] 12 of incubation, it is not surprising that its auditory system is well developed before hatching and that the embryo can even form memories of auditory stimuli" (47). See also Swiss Society for the Protection of Animals STS, Laying Hens: 12 Years of Experience with New Husbandry Systems in Switzerland (Bern: Kummerly & Frey AG, 1994), 13: "Unhatched chicks also respond to soothing sounds from the mother and to warning cries of the cock."
39. Sullenberger, "Roosters," 6.
40. Sullenberger, "Roosters": "Once again every rooster knows where every other rooster is. So how come they crow when there hasn't been an emergency? Because range roosters are constantly moving while they are feeding and each sub-flock is someplace different every few minutes" (7). See also G. McBride, et al., "The Social Organization and Behaviour of the Feral Domestic Fowl," Animal Behaviour Monographs, Part Three 2.3 (1969): 136-137, 166-67.
41. Though, as McBride states, identifying components of communication in chickens is problematic, because "Birds and their environment, including con-specifics, constitute a communication system. Every movement, change of

movement and absence of movement contain information as does the physical, botanical, zoological and conspecific environment. Birds respond to the whole system" (164).

42. Sullenberger, "Roosters," 3. See also Robert Burton, Egg: A Photographic Story of Hatching (London; New York: Dorling Kindersley, 1994), 10.
43. McBride, 165-168. 179.
44. Rick and Gail Luttmann, Chickens in your Backyard: A Beginner's Guide (Emmaus, PA: Rodale Press, 1976), 46. McBride states that the "active bonding behaviour in the form of interactions between individuals"—mating, sharing food, preening each other, giving shelter or protection—"actively foster[s] the tendency to form bonds" (174). See also North and Bell: "There is proof that males mate with certain females, and if a particular male becomes unable to mate, his matching females will not take another male until he is removed" (391).
45. Luttmann, 46.
46. See McBride. When the dominant male in the flock was threatened, "he gave the alarm call and walked parallel to the predator or potential predator while the hens quietly hid. When the flock was disturbed, males were actually observed to drive females away, by rushing toward them with wings spread." When hens were feeding, "one characteristically saw males standing alert behind cover" (142-143). See also Smith and Daniel: "A hen will almost invariably fight to protect her chicks" (324).
47. Smith and Daniel, 66.
48. Cathy Sadler, letter, The Daily Times (Salisbury, MD), August 27, 1991: 5.
49. This has been our experience. We usually have 5 or 6 roosters and about 30 hens at any one time. See also Luttmann, 49; Smith and Daniel, 165-166; McBride, 135.
50. Smith and Daniel, 165-166; 316.
51. Smith and Daniel, 320.
52. Smith and Daniel, 170.
53. Smith and Daniel, North and Bell, 33-34.
54. Burton, 10. See note 42 above.
55. My account of the formation of a hen's egg derives from Chapter 9, "The Hen and Her Egg," in Smith and Daniel, 169-180; and Chapter 3, "The Formation of the Egg," in North and Bell, 31-44.
56. "If the males are removed from the flock of hens, some fertile eggs will be produced for as long as 4 weeks but the percentage of fertile eggs decreases each day after removal of the males, the decrease being more rapid after the fourth or fifth day" (North and Bell, 46).
57. As stated in The Chicken Book, even salamanders need prolactin for reproduction; thus, "With the force of adaptive pressures, as skin develops scales, scales become feathers, and fingers lengthen into wings, a few substances such as prolactin resist the pressure of evolution, and represent a kind of biochemical signal indicating again that chickens, and ourselves, are still members of a family, and a single family at that, of living creatures" (Smith and Daniel, 183-184).
58. Smith and Daniel, 180.
59. C. David Coats, Old MacDonald's Factory Farm: The Myth of the Traditional Farm and the Shocking Truth About Animal Suffering in Today's Agribusiness (New York: Continuum, 1989), 93-94.
60. North and Bell, 105. See note 15 above.
61. North and Bell, 4.
62. Country Fair Farms, Westminster, MD, Jan. 25, 1993.
63. For a detailed account of embryonic development and hatching, see Chapters 1 and 2, "Development of Brain and Behaviour Before Hatching" and "Environmental Influences on Development of the Embryo," in Rogers, The

Development of Brain and Behaviour in the Chicken, 1-71. See also Chapter 4, "Development of the Chick Embryo," in North and Bell, 45-53; and Chapter 10, "The Egg and the Chick," in Smith and Daniel, 189-203.
64. North and Bell, 48.
65. North and Bell, 49.
66. North and Bell, 49.
67. Rogers, 22, 39.
68. Smith and Daniel, 195-199.
69. North and Bell, 758-759.
70. N. Fowler, "Competitive exclusion—the way forward?" International Hatchery Practice 5.1 (1990): 5, 9.
71. See generally Chapter 35, "Developing Immunity," in North and Bell, 753-766.
72. Peter Hunton, "Genetics and Breeding as They Affect Flock Health," The Health of Poultry, ed. Mark Pattison (Harlow, Essex: Longman Group UK Ltd., 1993), 8.
73. Sharon Heins Miller, "Increased Marek's Condemnations . . . New Strains or Old Problems?" Broiler Industry May 1996: 30.
74. Jane Brooks, "'This won't hurt a bit,'" The News Journal (Wilmington, DE) Jan. 10, 1994: D1.
75. Diseases of Poultry, 9th ed. 648.
76. North and Bell, 826.
77. North and Bell, 50.
78. North and Bell, 51.
79. North and Bell, 51; Rogers, 20-21.
80. Gage, 2. Compare this with the treatment of newly hatched chicks at Seaboard Farms in Mayfield, KY, where the chicks are "thrown into the air after hatching to remove the shells thoroughly." Nancy Danowski, letter to the author, July 23, 1994.
81. Smith and Daniel, 320. See esp. Rogers, 41, 47-53. E.g., "Towards the end of the incubation period the embryo itself can exert some control over [the] environment . . . by communicating with the hen. For example, certain vocalizations made by the chick embryo stimulate the hen to turn the eggs and to vocalize in turn. The results of this interaction are tactile and auditory stimulation of the embryo, together with the regulation of temperature" (3-4). "Mutual communication between the embryos and the hen occurs from day E[embryonic age]18 on. The embryo may also obtain influential stimulation from its own heart-beat and the heart-beat of the hen" (41). The chick embryo's "auditory system is well developed before hatching and . . . the embryo can even form memories of auditory stimuli" (47). "There is two-way communication between the embryos and the hen. The vocalizations produced by chick embryos also elicit responses from the hen" (51). "Moreover, the embryos also communicate with each other. Chick embryos produce clicking sounds in the period between pipping the egg shell and hatching. . . . [I]n quail these clicking sounds synchronize hatching between members of the same clutch. . . . Clicking serves the same purpose in embryos of the domestic fowl" (52).
82. Smith and Daniel, 321.
83. Rogers, 1-3.
84. Smith and Daniel, 323.
85. Smith and Daniel, 323-324; Rogers, 83-84.
86. Smith and Daniel, 324.
87. Farb, letter to the author, April 1, 1993.
88. North and Bell, 251-252.
89. "Chicken Hell: Research & Investigations Takes You Inside a Hatchery," PETA

NEWS 8.2 (Spring 1993): 10. See Lyon Electric Company pamphlet Bulletin 281-184 (July 1990), In Depth 6-10 Days Old Precision Debeaking, 2: "The cutting and cauterizing operation emits smoke that has residual beak material in it which builds up on the front area of the unit. After use, the unit cools to room temperature [from 1500 degrees F (over 800 degrees C) when in use]. The beak residue hardens and the heated metal parts contract. This condition happens everytime [sic] the equipment is used."

90. "Chicken Hell," 10.
91. R. Smith, "Embrex moving to be 'third window' in pushing broiler industry productivity," Feedstuffs, April 1, 1996: 9. Danowski writes, "This summer I toured a hatchery here in Mayfield [KY]—Seaboard Farms. . . . The foreman told me how the chicks can suffer spinal injury or brain damage if vaccinated in the wrong area of the neck. It was a horrible experience." See note 80 above.
92. "Immune system has three components," Poultry Digest Nov. 1995: 26: "Injection of vaccines disrupts the skin barrier, and unless sterility of equipment is carefully maintained, gives invading organisms an open door to their host." See "Chicken Hell": "Workers giving vaccinations use the same needle over and over" (10).
93. "The Dead-Chicken Problem," Discover Dec. 1993: 22.
94. "Chicken Hell," 10- 11.
95. "Chicken Hell," 11-12.
96. Alice Walker, "Why Did the Balinese Chicken Cross the Road?" Living by the Word: Selected Writings 1973-1987 (New York: Harcourt Brace Jovanovich, 1988), 171.
97. Walker, 172.

Chapter Three THE LIFE OF THE BATTERY HEN

1. American Poultry History, 244.
2. Rogers, 218.
3. North and Bell, 658, 673.
4. Clare Druce, Chicken and Egg: Who Pays the Price? (London: Green Print [The Merlin Press], 1989), 7. See also North and Bell, 31-32, 34, 407; Smith and Daniel, 176.
5. North and Bell, 31-32.
6. North and Bell, 40.
7. See generally Chapter 18, "Light Management," in North and Bell, 407-431.
8. Vicky Fleishman, Country Fair Farms, Westminster, MD, Jan. 25, 1993.
9. Approximately 101.2 million spent commercial laying hens were slaughtered in 1995 compared to 35.6 million cattle and 96.3 million pigs. Robert H. Brown, "UEP says industry's best hope is rendering," Feedstuffs Dec. 12, 1994: 17. Livestock Slaughter 1995 Summary (Washington D.C.: National Agricultural Statistics Service, U.S. Dept. of Agriculture, March 1996): 1.
10. R. Brown, "Egg Producers concerned about loss of spent fowl slaughter market," Feedstuffs Dec. 20, 1993: 1.
11. R. Brown, 1.
12. "[S]pent fowl (culled laying hens) frequently suffer broken bones when electrically stunned, and their low economic value (.02-.08/lb) makes it difficult to justify costly new slaughter techniques." John R. Boyce, D.V.M., Asst. Dir. Div. of Scientific Activities, AVMA, letter to the author, Dec. 15, 1992.
13. Smith and Daniel, 287.
14. Lynn Shepherd, "The Chicken Farm: A Personal Search for a Humane Breakfast" (term paper for a course on Society and Environment, Metropolitan State College of Denver), May 5, 1993, 5-6.
15. J.D. Costello, "Hen Rehabilitation," A Place in the Country (Nantucket, MA:

New England Farm and Home Association) 13 (Sept. 1981): 1-2.
16. "Test market campaign set to go," Egg Industry May/June 1992: 8.
17. "Healthy, Productive Management Practices of the U.S. Egg Industry." Undated United Egg Producers brochure.
18. Henk Wentink, "Perspective," Egg Industry March/April 1993: 44.
19. Country Fair Farms. This claim is a standard formula. See e.g., the Farm Animal Welfare Network booklet Hidden Suffering: Notes Accompany the Videotape, ed. Clare Druce (Holmfirth, Huddersfield, U.K., 1993), 35: "Friends of the battery egg trade frequently claim that caged hens are content, being warm and protected from adverse weather, predators etc. Some claim the birds are 'singing' in their cages." Druce compares this to British slaveholders' claim that African slaves forced to jump in their chains were "dancing" (34-35).
20. See, e.g. Klaus Vestergaard, "The Wellbeing of the Caged Hen—An Evaluation Based on the Normal Behaviour of Fowls," Tierhaltung 12 (1981):150-151: "[F]rom the studies which are so far available, it can be concluded that hens are more fearful in battery cages than in pens and that the fear tends to increase with density. Hysteria, which is characterized by sudden wild flight, squawking (fear squawking?) and attempts to hide, has been interpreted as an abnormal Fright-flight behaviour (Hughes 1961). . . . [I]t appears that . . . 1) the behavioural reactions of fear and hysteria are similar (flying, hiding, vocalizing), 2) there is an association between nervousness (=fear) and hysteria, and 3) both fear and hysteria tend to increase with crowding."
21. Such was my impression while doing undercover work at a battery complex in Maryland comprising five long buildings connected from the inside. The average battery-cage building is 50 ft. wide 500 ft. long (North and Bell, 323-324). The goal is to fit as many cages as possible into the building. North and Bell state: "[M]any methods have been originated to get more cages in a given area . . . [t]o conserve space, thereby reducing the investment in the house in which the laying cages are placed" (319).
22. Peter H. Roberts, "Egg Production," CIWF Fact Sheet (Compassion in World Farming, Petersfield, Hampshire, UK) July 1987: 2.
23. North and Bell, 317-319. See generally David J. Wolfson, Beyond the Law: Agribusiness and the Systemic Abuse of Animals Raised for Food or Food Production (New York: Archimedian Press, 1996). There is "no federal law applicable to the treatment of animals raised for food or food production while on the farm" (3). States traditionally and increasingly "prohibit the application of the anti-cruelty statute to 'accepted,' 'common,' 'customary,' or 'normal' farming practices" (8).
24. Danny M. Hooge, "Laying hen nutrition at high production, stocking densities," Poultry Digest Aug. 1994: 16, 20.
25. Recommended Guidelines of Husbandry Practices for Laying Chickens, United Egg Producers, n.d.: 3.
26. M[ichael]. R. Baxter, "The welfare problems of laying hens in battery cages," The Veterinary Record 134 (June 11, 1994): 617.
27. Smith and Daniel, 270-271.
28. "With several commercial strains of laying hens now achieving 240 eggs per hen housed at 60 weeks of age . . . the stresses of high production and high stocking density can bring on [nutritional] deficiency symptoms which were not a problem a few years ago" (Hooge, 14). See also Bell, "Forces that have helped shape the U.S. egg industry: the last 100 years," The Poultry Tribune, Sept. 1995: 38. See also Layers and Egg Production 1995 Summary (Washington, D.C.: National Agricultural Statistics Service, U.S. Department of Agriculture, January 1996): 2.
29. Druce, Chicken and Egg, 8.
30. Peace Corps, Practical Poultry Raising Manual, 21, 33. See Chapter 1, note 23.

31. K. Keshavarz, "Causes of prolapse in laying flocks," Poultry Digest Sept. 1990: 42. See also Juliette de Bairacli Levy, The Complete Herbal Handbook for Farm and Stable (London: Faber and Faber 1952), 300. Levy links prolapse to the hen's "inability to stand the constant exercise of egg-laying, often promoted to excess by use of chemical stimulating laying meals, salts, powders, etc., and the cruel method of prolonging laying hours by use of artificial lighting after the normal dusk roosting." North and Bell state that prolapse is "more prevalent in cages than with regular nests where the birds are not exposed during the time the oviduct is being retracted [drawn back into the body after the egg is laid]" (366).
32. Konrad Lorenz, "Animals Have Feelings," trans. E.M. Robinson, Der Spiegel 47 (1980). See Druce, Hidden Suffering, 9-10.
33. Vestergaard, "Alternative Farm Animal Housing: Ethological Considerations," Scientists Center Newsletter 9.3 (1987): 10. Smith and Daniel: "It is a sad commentary that hens deprived of the ancient ritual of nest examination and selection may instead pace the limited confines of their cage at a rate of up to two thousand paces per hour" (173).
34. Druce, Chicken and Egg, 4-5. For an overview of "economically important" developmental, metabolic, and miscellaneous diseases and disorders in the modern poultry industry, see Diseases of Poultry, 9th ed., 827-862.
35. Marian Stamp Dawkins, Through Our Eyes Only? The search for animal consciousness (Oxford; New York: W.H. Freeman and Company, 1993), 153.
36. North and Bell, 321.
37. Michael C. Appleby, Do Hens Suffer in Battery Cages, A Review of the Scientific Evidence Commissioned by the Athene Trust (Edinburgh, Scotland: Institute or Ecology and Resource Management, The University of Edinburgh, October 1991), 7-8. See also The State of Poultry Welfare in Canada, Researched and written by Animal Action (Ottawa, Canada, February 15, 1996). Dr. Ian Duncan explains: "Many cages have steeply sloping floors, so that birds are constantly slipping and thus developing callouses on their feet—thick skin that can split and allow disease into the blood system. Their feet can be further damaged because cage floors may be rough due to poor galvanizing: floors are coated with zinc to prevent rusting, but the zinc can be applied in a way that leaves small, rough protuberances on the floor"(8).
38. So are heads. See the video Raw Footage, Raw Pain: An Inside Look at an Intensive Egg Farm (Boulder Valley Poultry Farms, Boulder, CO), Rocky Mountain Animal Defense, 1993 (12 min.); and the follow-up investigative video Boulder Valley Poultry Farms 12/94 News Coverage, RMAD, 1994 (9 min.). Moreover, Dr. Michael Baxter testified in a case against Alpine Poultry in Australia, when catchers rip the hens out of the cages, the hens' fear reaction is to grip the floor ("Alpine Poultry Trial," Action Animal Liberation Magazine [Melbourne, Australia] 50 [Dec. 1994]: 9). A photo of hens' feet dumped from a transport crate at the slaughter house appears in Action ALM, No. 46 (1993): 2. A big reason hens get torn apart during catching is that the cage doors—"gates"—are narrower than their bodies. Rescuing hens at a facility in Maryland, we were able to pull a hen from the cage only with great care.
39. Dawkins, 153.
40. Diseases of Poultry, 9th ed., 835-836: As noted about this much talked about disease, "The condition has been restricted to birds in cages" (835).
41. Sullenberger, letter to the author, Feb. 27, 1994.
42. R. Brown, "Egg producers concerned about loss of spent fowl slaughter market," Feedstuffs, Dec. 20, 1993: 1.
43. Diseases of Poultry, 9th ed., 849.
44. Diseases of Poultry, ed. M.S. Hofstad, et al., 8th ed. (Ames, IA: Iowa State

University Press, 1984), 775: "The shift from floor-reared layers to cage confine ment was not without creation of new problems. . . . Among these is the fatty liver syndrome characterized by fat deposits, fatty livers, and drop in egg production." See also Johnson, Factory Farming: "Lack of exercise can be blamed for fatty degeneration of the liver, followed by hemorrhage and sudden death" (29).

45. Merck Veterinary Manual, 7th ed. (Rahway, NJ: Merck & Co., 1991), 1619. Diseases of Poultry, 9th ed., 669-673.
46. Doll Stanley-Branscum summarized the diagnosis of Dr. Ann Reese, who examined and euthanized the affected birds, in a personal communication to the author, July 15, 1996.
47. John S. Avens, "Overview: Salmonella—What's the Problem?" Third Poultry Symposium Proceedings: Managing for Profit June 16-June 18, 1987 (Fort Collins, CO: Colorado State University, 1987), 122.
48. North and Bell, 772. According to Fowler, "Such [antibiotic/ antimicrobial] therapy, whether given specifically for salmonellosis or for other microbial agents, has destructive effects on the normal intestinal microflora, rendering the birds highly susceptible to salmonella intestinal colonization after cessation of therapy" (9). See Chapter 2, note 70.
49. The link between salmonella, antibiotics, and global concentrations of birds was discussed at the International Egg Commission's 1995 conference in Stockholm, Sweden: "[A]t the end of 1980 a dramatic change occurred when a certain serotype of salmonella (S. enteritidis) changed its properties so it could infect the egg and/or cause disease in humans with relatively few bacteria. Due to the global concentration of the production of breeding birds this change resulted in a severe worldwide epidemic of salmonellosis in humans, demonstrating the necessity to control salmonella in layers producing eggs for human consumption. . . . In addition, the often uncontrolled use of antibiotics, as an easy way to control the situation, in combination with the great ability of the more than 2,000 different types of salmonella bacteria to adapt to new situations, have contributed to the current serious situation. Of the food-producing animals, poultry is most often considered as the main source." Terry Evans, "IEC gathers in Stockholm," Egg Industry Oct. 1995: n.p.
50. Johnson, 29-30. An ad in Feedstuffs March 16, 1992: 27, says, for instance, "Neo-Oxy [Neomycin-Oytetracycline] 50-50 is effective controlling CRD [chronic respiratory disease] complex and as an aid in prevention of bacterial Enteritis and control [sic] Neomycin sensitive organisms. Also to extend period of high egg production, feed efficiency in presence of disease and stress." Sick hens are thus forced to produce eggs and do other strenuous metabolic work when they should be resting. Eggs from sick hens on medication may be sold to consumers or used for hatching.
51. Sharon Begley, "The End of Antibiotics," Newsweek March 28, 1994: 48.
52. Smith and Daniel, 271-272.
53. "Meat and bone meal as well as blood meal, feather meal, hatchery debris [eggshells, unhatched eggs, dead birds], and fish meal serve as sources of protein and minerals incorporated in feed produced for food producing animals," Third Poultry Symposium Proceedings, Colorado State University, 1987, 134. For an overview of feed ingredients including poultry manure, see Bruce Webb, "There's Something Genuinely Offal in Farm Feeds, "Mainstream (Animal Protection Institute, Sacramento, CA) Spring 1992: 28-29. See also Nutrient Requirements of Poultry, 8th revised ed. (Washington, D.C.: National Academy Press, 1984), 6, 35-47. See also Egg Industry, March 1977: 4: "Cornell University researchers, faced with the high cost of drying manure in order to refeed it to layers, hit upon a new idea for recycling manure—feed it wet!" See also R.

Brown, "UEP [United Egg Producers] says industry's best hope is rendering," Feedstuffs, Dec. 12, 1994: 17: "Equipment is now available, or is coming, for recycling not only spent hens but also poultry manure into products for feed and fertilizer." See also Frank T. Jones and Kurt E. Richardson, "Fallacies exist in current understanding of salmonella," Feedstuffs Jan. 22, 1996: 1, 22-25: "'Despite the many potential sources of contamination, poultry feed, especially that containing animal by-products, has long been incriminated as a primary source of salmonella contamination'" (22).
54. Diseases of Poultry, 9th ed., 852.
55. For an overview, see Fiona S. Carlile, "Ammonia in Poultry Houses: A Literature Review," World's Poultry Science Journal 40 (1984): 99-113.
56. Carlile, 101.
57. Bell, The Poultry Tribune, Sept. 1995: 37.
58. Pullet Cage System, (color brochure with photos), Register, GA: Farmer Automatic of America, Inc.
59. Bell, The Poultry Tribune, 37.
60. Evans, "IEC (International Egg Commission) gathers in Stockholm." See note 49 above.
61. Bell, "An egg industry perspective: Ready for the 21st century?" Poultry Digest Jan. 1990: 26. I confirmed this information in a phone call to Bell, April 16, 1996.
62. "Environment: An Alchemy of Fowl," 1991 Annual Report, Athens, GA: The University of Georgia College of Agricultural and Environmental Sciences, 14.
63. Jim Mason and Peter Singer, Animal Factories, Revised and updated (New York: Harmony Books, 1980, 1990), 3.
64. Mason and Singer, 3.
65. Bell, The Poultry Tribune, Sept. 1995: 37.
66. As we saw at two egg complexes in Maryland, Country Fair Farms in Westminster and ISE in Galena.
67. Wentink, 44. See note 18 above.
68. Levy, 288-289. See note 31 above.
69. Bird Man of Alcatraz, dir. John Frankenheimer, United Artists, 1962.
70. "The Best Method of Cocci Control Has Been in Development For Over 6,000 Years." (advertisement, Elanco Products Co., A Division of Eli Lilly), Feedstuffs Aug. 6, 1990: 13.
71. Wiebe van der Sluis, "Will we ever get rid of the disease?" World Poultry Aug. 1993: 16.
72. George E. Coleman, "One Man's Recollections Over 50 Years," Broiler Industry July 1976: 51.
73. North, "Startling changes ahead in production practices," Broiler Industry July 1976: 88.
74. North and Bell state: "When birds are given limited space, as in cages, there is a tendency for many to become cannibalistic" (309). See "Vices Related to Feeding-Like Behavior" in Chapter 13 of James V. Craig, Domestic Animal Behavior: Causes and Implications for Animal Care and Management (Englewood Cliffs, NJ: Prentice-Hall, 1981), 208-212.
75. Rogers, 96.
76. Rogers, 219.
77. Vestergaard, et al., "Feather pecking and chronic fear in groups of red jungle fowl: their relations to dustbathing, rearing environment and social status," Animal Behaviour 45 (1993): 82.
78. Vestergaard, "Feather pecking," 82.
79. Eldon W. Kienholz, letter to Donald J. Barnes, Feb. 13, 1990.
80. G. Coleman, Broiler Industry July 1976: 51. "Out," that is, for broiler chickens

but not laying hens.

81. Elbert J. Day, "Broiler Nutrition: Yesterday, Today and Tomorrow," Broiler Industry July 1976: 142.
82. Craig, Domestic Animal Behavior, 243-244.
83. Craig, et al., "Beak Trimming Effects on Beak Length and Feed Usage for Growth and Egg Production," Poultry Science 71 (1992): 1830-1841.
84. I[an].J.H. Duncan, et al., "Behavioural Consequences of Partial Beak Amputation (Beak Trimming) in Poultry," British Poultry Science 30 (1989): 479-488. Michael J. Gentle, et al., "Behavioural evidence for persistent pain following partial beak amputation in chickens," Applied Animal Behaviour Science 27 (1990): 149-157.
85. D.L. Cunningham, "Beak-Trimming Effects on Performance, Behavior and Welfare of Chickens: A Review," Journal of Applied Poultry Research 1 (1992): 129-134. "Close examination of filmed feeding activity . . . showed that beak trimmed birds were not able to grasp feed pellets as efficiently as intact birds. . . The results of these studies of ingestive behavior and the associated observations of decreased feed usage and depressed weight gains leave little doubt that a reduction in the bird's ability to consume feed, and possibly water, occur as a result of trimming" (131). Nevertheless, according to Craig, et al., "significant differences in feed consumed, feed wasted, and efficiency of feed used for egg production indicated an economic advantage in favor of beak trimming" ("Beak Trimming Effects,"1830).
86. Wilson, American Poultry History, 234.
87. North and Bell state: "Origin of the social order begins when the birds are about 8 to 10 weeks of age, but is not fully consummated until they approach sexual maturity. Because social dominance in either sex is not evident prior to 8 to 10 weeks of age, it is possible to raise large numbers of broilers in a single pen without fear that the birds will develop social agonistic characteristics. There is no challenge among individuals for social dominance during broiler age" (544-545).
88. Sarah Muirhead, "Future quality of birds depends largely on influences early on," Feedstuffs June 7, 1993: 20.
89. North and Bell, 246-251. See esp. 248.
90. Bulletin 281-184, 1. See Chapter 2, note 89 above.
91. See e.g., Charles J. Wabeck, Raising Your Home Chicken Flock, Cooperative Extension Service University of Maryland System, Institute for Agriculture and Natural Resources (1974; revised 1991-1992), 10.
92. Wabeck, 10.
93. Quoted in Mason and Singer, 39-40.
94. Duncan, "The Science of Animal Well-Being," rpt. from a speech in Animal Welfare Information Center Newsletter (National Agricultural Library) 4.1 (Jan.-March 1993): 5.
95. Farm Animal Welfare Council, Report on the Welfare of Laying Hens in Colony Systems (London: MAFF Publications, Dec. 1991), 23-24.
96. North and Bell, 250.
97. North and Bell, 246, 248, 251.
98. F.D. Thornberry, et al., "Debeaking laying stock to control cannibalism," Poultry Digest May 1975, 207.
99. North and Bell note a "general nervousness found in some of the Leghorn strains" (841).
100. Consider Duncan's comment in The Christian Science Monitor ("Kinder, Gentler Hens For the '90s," Oct. 4, 1994: 11): "Mr. Duncan says the fierce hen-pecking is less a result of aggressive tendencies, than 'a feeding mechanism gone wrong.' He says that because 95 percent of the birds in North America are

kept in cages, they've started to mistake their cagemates for food."
101. See Wilson, American Poultry History: "A product of man's concentration of poultry under situations of stress is the appearance of a condition known as avian hysteria. The afflicted flock's behavior is typified by extreme nervousness, often exhibited at closely spaced timed intervals with clock-like regularity. . . . This condition, first reported in the late 1950's, is linked to man's concentration of bird numbers in conditions of total confinement" (234).
102. Diseases of Poultry, 9th ed., 827.
103. Chris Sigurdson, "Purdue's kinder, gentler chicken moves into real-world test," Feedstuffs, Jan. 16, 1995: 47.
104. "Feed savings could justify beak trimming," Poultry Digest March 1993: 6.
105. American Veterinary Medical Association, Animal Welfare Position Statements and Background Information, revised June 1992, 18-19.
106. See Baxter, 616. See also Vestergaard, "Aspects of the Normal Behaviour of the Fowl," Tierhaltung 12 (1981): 7.
107. Vestergaard, "Alternative Farm Animal Housing: Ethological Considerations," Scientists Center Newsletter 9.3 (1987):10.
108. Muirhead, "Control of heat stress essential to keep hens laying in hot weather," Feedstuffs April 5, 1993: 13. Blyn Brown, "Improving broiler breeder performance in hot weather," Poultry Digest May 1993: 10-14.
109. North and Bell, 336-337.
110. Marilyn Coleman, "The Real Impact of Breeders and Hatchery Upon Condemnation," World Poultry 11.3 (1995): 17.
111. "Heat deaths," Egg Industry Aug. 1995: cover.
112. Stephen Power and Cheong Chow, "Chickens live on as energy source," The Boston Globe July 10, 1993: 1, 9.
113. North and Bell, 322-323.
114. Gentle, "Aetiology of food-related oral lesions in chickens," Research in Veterinary Science 40 (1986): 219-224.
115. Anthony Phelps, "Hens fed coarse meals devour profits," Feedstuffs June 10, 1991: 11.
116. Bruce R. Behrends, "Is feed the problem?" Egg Industry Sept./Oct. 1992: 17-18. B. Brown, Poultry Digest May 1993: 14.
117. Kathy Geist, letter, The Friendly Vegetarian (Washington, DC: Friends Vegetarian Society of North America) 37 (Fall 1991): 3. Her letter describes her visit to "a Mennonite family farm which has become a modern factory farm for eggs" in Pennsylvania.
118. See North and Bell, 433-452.
119. North and Bell, 433-434.
120. Smith and Daniel, 176.
121. North and Bell, 433, 436, 440, 444.
122. Bell and Douglas R. Kuney, "Effect of Fasting and Post Fast Diets on Performance in Molted Flocks," Journal of Applied Poultry Research 1 (1992): 200-201. North and Bell, 447-448.
123. The Welfare of Battery Hens Regulations 1987 (SI 1987 No. 2020). In a letter to Clare Druce, August 1995, Judith Harris of the Ministry of Agriculture, Fisheries and Food (MAFF) wrote: "Schedule 1 of the Welfare of Livestock Regulations 1994 states that 'except in the case of therapeutic or prophylactic treatment, all laying hens shall have access to adequate, nutritious and hygienic feed each day in sufficient quantity to maintain them in good health and to satisfy their nutritional needs, and to adequate fresh drinking water at all times.' This provision applies to laying hens kept in battery cages and is a consolidation of requirements previously set out in the Welfare of Battery Hens Regulations 1987 and

the Welfare of Livestock Regulations 1990. . . . These provisions prohibit the traditional moulting programmes, which relied on removing feed and water for a period of at least 24 hours."

124. The USDA publishes forced molting statistics under the title of "Eggs and Layers: Layers on Hand and Eggs Produced by Type, and Forced Molt, 30 Selected States [in a given time-period, e.g., Nov.-Dec. 1994-1995]," in Chickens and Eggs, Washington, D.C.: National Agricultural Statistics Service, U.S. Department of Agriculture. Thus, on Dec. 1, 1995, 2.3 percent of 279,428,000 total layers (including "Table Egg Type" and "Hatching Egg Type" hens) were being force molted, i.e. 6,427,000 hens, of whom the majority were the "Table Egg Type," comprising 230,388,000 hens (Chicken and Eggs report released January 31, 1996: 6).
125. Druce, letter, UKEPRA NEWS (a weekly egg producer's magazine in the UK) July 7, 1995: 7: "The head of the poultry department in a leading UK agricultural college told me that battery hens being force moulted in the USA are left 'until their combs turn blue,' then revived." The speaker's identity as Dr. Peter Dun was conveyed in a personal communication to the author, Aug. 8, 1995.
126. North and Bell, 434.
127. North and Bell, 439. See also Keshavarz, "Impact of Feed Withdrawal and Dietary Calcium Level on Force-Rested Hens," Journal of Applied Poultry Research 4.3 (Fall 1995): 254-264: "The results of the current experiments failed to show that egg production and shell quality can be maintained satisfactorily when the feed withdrawal period is reduced to 5 or 7 days as compared to conventional periods of 10 to 14 days. . . . However, alternative methods of induction of force-rest requiring a shorter feed withdrawal period are more appealing from an animal welfare point of view" (262-263).
128. Bell, "Effect of Fasting," 200.
129. Bell, "The Economics of Various Molting Methods," Feedstuffs July 1, 1967: 4.
130. Bell, "Effect of Fasting and Post Fast Diets," 206.
131. Bell, The Poultry Tribune, Sept. 1995: 38.
132. Article by Charles F. Strong, Journal of Applied Poultry Research 1 (1992) 56.
133. Peter S. Holt and Robert E. Porter, Jr., "Effect of Induced Molting on the Course of Infection and Transmission of Salmonella enteritidis in White Leghorn Hens of Different Ages," Poultry Science 71 (1992): 1842.
134. A. Bruce Webster, et al., Update On Hen Disposition, paper presented at the 1996 International Poultry Exposition Egg Program (Atlanta, GA), Jan. 25, 1996, 5.
135. Stanley-Branscum, "Rescuing Layers," PoultryPress (quarterly newsletter of United Poultry Concerns) 5.2 (Spring/Summer 1995): 3.
136. Tom Devine, "The Fox Guarding the Hen House," Southern Exposure (Institute for Southern Studies, Durham, NC), 17.2 (Summer, 1990): 42. Druce, Chicken and Egg, 11-12.
137. R. Brown," "Spent fowl turning into popular school lunchroom fare," Feedstuffs Jan. 20, 1992: 22. "Cooked spent fowl used by military," Feedstuffs July 12, 1993: 13. "Egg producers concerned about loss of spent fowl slaughter market," Feedstuffs Dec. 20, 1993: 1. The pet food market is problematic because whole feathers are "difficult to render . . . due to feathers absorbing cooking fat and whole feathers plugging screens and grinders." Doug Baskin, Tyson Foods, Rendering at the Plant: Alternatives for Leghorn Hen Disposition, paper presented at the 1995 International Poultry Exposition Egg Program, Jan. 19, 1995, 3.
138. Baskin, 4, 6, 8.
139. Webster, 1-5. Charles Perry, "Whither spent hens," Poultry Digest Jan. 1994: 4. Charles House, "Company hopes to crack spent-hen problem," Feedstuffs Oct. 24, 1994: 22. John Pedersen, "Beginning the new year with old hens," Egg Industry Jan. 1995: n.p.

140. R. Brown, "Egg Producers concerned . . ." see note 137 above.
141. Webster, 1. For a discussion see Webster, et al., "Humane On-Farm Killing of Spent Hens," The Journal of Applied Poultry Research 5.2 (Summer 1996): 191-200.
142. As stated in Wolfson: There is "no federal law applicable to the treatment of animals raised for food or food production while on the farm" (3); and the federal Humane Slaughter Act "excludes chickens" (5).
143. Raw Footage, Raw Pain and sequel. See note 38 above.
144. Recommended code of practice for the care and handling of poultry from hatchery to processing plant, Agriculture Canada Publication 1757/E, 1989, 15, 19.
145. March 26, 1992-European Report-467(AC). Qtd. in AWI Quarterly (Animal Welfare Institute, Washington, D.C.) 41.3 (Summer 1992): 19.
146. "A Cage is Still a Cage," Agscene 110 (Spring 1993): 6. See also Ruth Harrison, "The myth of the barn egg," New Scientist Nov. 30, 1991: 40-43.
147. "The Swiss Animal Protection Act came into force in 1981. This prescribes minimum requirements for the behaviorally appropriate housing of productive livestock and experimental animals and for animals kept in homes. It has become famous for its section on the housing of chickens" (Laying Hens, 3). See Chapter 2, note 38.
148. Nicol and Dawkins, 50. See Chapter 2, note 31 above.
149. R. Brown, "Sweden postpones ban on hen cages," Feedstuffs March 7, 1994: 11. Mary Ann Sorensen, "Despite pleas for logic, Sweden to ban battery cages" (letter), Feedstuffs April 11, 1994: 8.
150. "IEC gathers in Stockholm: Niche Market in France," Egg Industry Oct. 1995, n.p.
151. "Danes buy more free-range and imported battery eggs," Egg Industry Nov. 1995: n.p.
152. Druce, Chicken and Egg, 2; Hidden Suffering 6.
153. Druce, Hidden Suffering, 39. See also Ruth Harrison's trenchant criticism of Britain's cop-out, "The myth of the barn egg," New Scientist Nov. 30, 1991.
154. "Success for Battery Egg Labels!" Agscene 121 (Spring 1996): 7.
155. Rod McGuirk, "Egg farms shock as Clark wins hen cruelty case," The Mercury (Hobart, Tasmania) Feb. 25, 1993: 1. "Battery Hen System Cruel Says Magistrate," Animal Liberation Magazine 44 (April-June 1993): 4.
156. Clarke v Golden Egg Farm PTY, Ltd., C/No. 36539/92 (Hobart Magistrates Ct. 1992).
157. Clarke v Golden Egg Farm, 13.
158. Philip J.A. Wright, letter to the author, Sept. 7, 1993.
159. Clarke v Golden Egg Farm, 13-14.
160. Clarke v Golden Egg Farm, 18.
161. "Pam Clarke: 'independent spirit challenging convention,'" Animal Liberation Magazine 45 (July-Sept., 1993): 4.
162. "Pass the Bill and Go Straight to Jail," Animal Liberation Action Magazine 46 (n.d.): 16.
163. "Australia's Disgrace," Animal Liberation Action Magazine 53 (Summer 1995): 10-13. Lynda Stoner, "Parkwood 4: 22 Hens Rescued from Hell," Animal Liberation Action Magazine 54 (Dec. 1995): 8-9.
164. Robin A. S. Lawson, Deputy Secretary, Operations and Corporate Services, Agriculture Victoria, letter to the author, Nov. 30, 1995.

Chapter Four THE LIFE OF THE BROILER CHICKEN

1. Cathryn Baskin, "Confessions of a Chicken Farmer," Country Journal April 1978: 38.
2. Roland C. Hartman, "Egg income drops behind broilers," Poultry Digest May

1976: 4.
3. Livestock and Poultry: Situation and Outlook, Economic Research Service, U.S. Department of Agriculture, May 1993: 6.
4. Margaret Webb Pressler, "Chicken or Egg? Today, There's No Question Which Is First," The Washington Post April 13, 1995: D12, D14.
5. Pressler, D12. Roy Gyles, "Technological Options for Improving the Nutritional Value of Poultry Products," Designing Foods: Animal Product Options in the Marketplace (Washington, D.C.: National Academy Press, 1988), 304.
6. R. Smith, "Cattle industry to continue rolling through large inventory," Feedstuffs Nov. 6, 1995: 28. See USDA Table.
7. Ray A. Goldberg, "Broiler Dynamics—past and future," Broiler Industry July 1976: 14.
8. The Editors, Broiler Industry July 1976: 14.
9. Broiler Industry, July 1976: 14, 49. Toni Guagenti, "Del.'' woman started broiler industry," Supplement, The Daily Times (Salisbury, MD), June 3, 1992: 20.
10. Broiler Industry July 1976: 50, 119.
11. See Chapter 1, note 36.
12. Broiler Industry July 1976: 56.
13. American Poultry History, 399-410.
14. Broiler Industry July 1976: 56.
15. Broiler Industry July 1976: 23-26. American Poultry History, 400-401.
16. Careers in the Poultry Industry: A Job is Ready When You Are (Washington, D.C.: The National Broiler, with the assistance of Merck Animal Health Division, Rahway, NJ, n.d.), n.p.
17. Mason and Singer, 45.
18. Stephanie Brush, "When Fur Starts to Fly," The Washington Post Aug. 13, 1989: F8.
19. "Dark chicken bones not a problem," Star Tribune (Minneapolis, MN) June 19, 1994.
20. The Poultry Tribune, Sept. 1995: 16.
21. People On The Farm: Broiler Growers (Washington, D.C.: Government Printing Office, U.S. Department of Agriculture, 1982), 13.
22. John Schleifer, "AAAP 32nd annual meeting features skeletal problem talks," Poultry Digest Oct. 1990: 10-14. See also and Bell, "Leg and Bone Problems in Broilers," 490-492. According to Feedstuffs, "the 'old-fashioned' chicken had an incidence of tibial dyschondropasia of 1.2%. This is in contrast to 49% incidence of the 'modern' chicken fed modern diets. . . . [G]enetic selection resulted in birds that grew three-and-one-half times faster than those of 35 years ago" (Roland M. Leach Jr., "Poultry industry should reconsider if bigger is better," Aug. 26, 1996: 10).
23. Gentle, "Pain in Birds," Animal Welfare 1 (1992): 242.
24. North and Bell: "[T]he skeleton is practically fully developed by 10 weeks" (315).
25. See e.g., Heidi Christensen, "The Further Processing Boom," Poultry Marketing & Technology Aug.-Sept. 1993: 11; in this same issue, see also Pamela Bowers, "A Diagnostic Dilemma," 18-19.
26. North and Bell, 499-504.
27. Bowers, "Riding KFC's Golden Coattails," 13. See note 25 above.
28. Wentworth Hubbard, "'Exciting future for breeders," Broiler Industry July 1976: 30-31.
29. Davis, "Researching the Heart: An Interview with Eldon Kienholz," The Animals' Agenda April 1991: 12-13.
30. Davis, "Researching," 12-13. In his letter to Don Barnes (Feb. 13, 1990), Kienholz wrote, "Even worse was the de-winging and de-tailing of both broiler chicks and turkey poults, with the hope (and excellent hypothesis) that we

would be able to produce such meat with 15% savings in feed costs. And, then I heard your question, 'How could anyone do such things?'"

31. Joy A. Mench, "Introduction: Applied Ethology and Poultry Science," Poultry Science 71 (1992): 632.
32. Rogers, 220.
33. Rogers states: "Chickens have well-developed vision with spectral sensitivities ranging from the infrared to the ultraviolet regions of the spectrum" (27); "The rod photoreceptors are used under conditions of low light intensity, particularly for detecting movement. . . . In chickens they barely function during the day, but at night they are turned on endogenously with the result of improving night vision" (118).
34. See e.g., C. A. Weeks, et al., "Behaviour of Broiler Chickens in Indoor and Free-Range Environments," Animal Welfare 3 (1994): 191: "Unless motivation to perform certain behaviours has . . . been bred out, which is unlikely (for example broiler-breeders show normal perching behavior, Apple et al 1988), it is probable that their limited mobility is accompanied by some behavioural frustration."
35. Scott Bronstein, "Chicken: How safe?" The Atlanta Journal-Constitution May 26, 1991: C1.
36. Bronstein, C5.
37. "Existing Technological Options and Future Research Needs," Designing Foods, 125.
38. Gyles, "Technological Options for Improving the Nutritional Value of Poultry Products," Designing Foods, 299.
39. Gyles, 307.
40. Robin Mather, "Fowl Play," The Detroit News July 6, 1993: D1. Hormones are introduced into poultry via the genetic route in experimental and primary breeding flocks—the "grandparents" of the commercial flocks. See e.g., "The Chicken Industry: New Products Promise Change." Genetic Technology News Aug. 1988: 8, 11: "Embrex (Research Triangle Park, NC) is developing a system for injecting vaccines or hormones into eggs. This could cut costs of administering products to chickens" (11). As of 1996, the U.S. Food and Drug Administration had not approved the use of hormones in commercial poultry feed, water, implants, or other routes at the consumer level. According to the FDA, "This does not mean that FDA would not consider approving a New Animal Drug Application (NADA) for a hormone to be used in poultry, rather that we have not yet done so. . . . FDA allowed the use of diethylstilbestrol (DES) pellets (implanted under the skin) in poultry beginning in 1947. DES was confined almost exclusively to chickens, and only 1 percent of the chickens produced in the U.S. were treated with DES when the practice was at its peak. In the 1950's, small residues of DES were detected in poultry skin, liver, and kidneys. There was no known threshold or safe level for DES, and there was no known method by which such a level could be established. Therefore, the Commissioner of Food and Drugs determined that the use of DES in poultry was unsafe to the consuming public. In 1961, the use of DES in poultry was suspended" (Linda A. Grassie, Communications and Education Branch, Center for Veterinary Medicine, FDA, letter to the author, July 15, 1996).
41. Day, "Future research needs focus on new, old problems," Feedstuffs July 23, 1990: 12, 15.
42. Druce, Chicken and Egg, 18. Diseases of Poultry, 9th ed., 293-299.
43. Muirhead, July 5, 1993: 11.
44. Muirhead, 11.
45. North and Bell, 383, 701-702. Wayne Harr, "Pullets help diversify Tennessee farm," Southern Poultry Oct. 1993: 7.
46. Druce, Chicken and Egg, 23-24.

47. North and Bell, 702.
48. Druce, Chicken and Egg, 23.
49. This experiment was described at the First North American Poultry Welfare Symposium, August 12-13, 1995, in Edmonton, Alberta Canada. According to Dr. J. Roger Broderson, Director of the Animal Care and Use Committee at The University of Georgia, university policy "encourages review of research proposed for all vertebrate animals. However, the Animal Welfare Act excludes considerations for avian species. . . . This study was not reviewed by the Institutional Animal Care and Use Committee" (letter to the author, Feb. 23, 1996). Regarding this device, Dr. Lesley Rogers states, "It certainly looks as if their [the birds'] olfactory sense would be prevented or impaired, and constant impact of the bars on the grills over the food dish or elsewhere may well cause irritation or inflammation of the nasal membranes. Other problems would be effects on visual behaviour. When chicks pick up stick-like objects that project from the beak outwards, as the nasal implants do, they run with them and other birds follow" (letter to the author, April 28, 1996).
50. North and Bell, 404. For a detailed look at the pet food industry and what goes into pet food, see API's Investigative Report on Pet Food (Sacramento: Animal Protection Institute of America, 1996). Call 1-800-348-7387.
51. Day, "Future research," 12. See note 41 above.
52. Charles Clover and Roger Highfield, "Animals fed to animals," The Weekly Telegraph March 27-April 2, 1996: 29.
53. Jones and Richardson. See Chapter 3, note 53 above.
54. Day, "Future research," 15.
55. Richard J. Julian et al., "Effect of poultry by-product meal on pulmonary hypertension, right ventricular failure and ascites in broiler chickens," Canadian Veterinary Journal 33 (June 1992): 385.
56. Ted W. Odum, "Ascites syndrome: overview and update," Poultry Digest Jan. 1993: 14-22. See 18.
57. Paul Cunningham, "'Water belly' no longer an emerging disease," Mid-Atlantic Poultry Farmer Nov. 24, 1992: 9. R. Smith, "Cutting edge poultry researchers doing what birds tell them to do," Feedstuffs Sept. 9, 1991: 1, 22.
58. T.H. Eleazer, "Rapid growth contributes to ascites in meat birds," Poultry Digest Dec. 1987: 494, 496. "The lungs of chickens grow much slower than the rest of the body and lung capacity does not keep up with rapid growth of muscle in these birds. The lungs are also rigid and molded into the thoracic cavity and cannot expand as do mammalian lungs" (496). See also North and Bell: "Lungs of the chicken are small compared with those of mammals. They expand or contract only slightly, and there is no true diaphragm. The lungs are supplemented by nine air sacs and the air-containing bones. They have four pairs of air sacs divided equally into thoracic and abdominal air sacs, plus one singular interclavicular sac. Air freely moves in and out of the air sacs, but the lungs are responsible for most of the respiration" (21). "Lungs in humans are like balloons. But lungs in chickens are like a flute with a balloon on the other end of the flute. Air goes through the chicken lung into an air sac, and then back through the lungs again before being expelled from the body" (Eldon W. Kienholz, letter to the author, Jan. 11, 1991).
59. Frederic J. Hoerr, "Pathogenesis of ascites," Poultry Digest Jan. 1988: 8-12. See 10.
60. Odum, 16.
61. Odum, 20-21.
62. North and Bell, 188. Peter D. Morris, et al., "Respiratory Symptoms and Pulmonary Function in Chicken Catchers in Poultry Confinement Units," American Journal of Industrial Medicine 19 (1991): 195-204. Carlile, "Ammonia in

Poultry Houses"; see Chapter 3, note 55 above.
63. Carlile, 99.
64. Lewis E. Carr and James L. Nicholson, "Delmarva Broiler Facilities—State of the Art," Transactions of the ASAE (American Society of Agricultural Engineers 1982), 740-744. See 743.
65. Hongwei Xin, "Poultry Energetics as Influenced by Ammonia and Temperature," Paper No. 86-4045 American Society of Agricultural Engineers (1986): 1.
66. Carlile, 99.
67. North and Bell, 189. Morris, 197.
68. Muirhead, "Ammonia control essential to maintenance of poultry health," Feedstuffs April 13, 1992: 11.
69. Xin, 2.
70. Carlile, 101.
71. Druce, Chicken and Egg, 18-19.
72. Muirhead, "Ammonia control essential," 11.
73. Xin, 2.
74. Carlile, 101. See also "Meat Bird Production/Growout," Food Safety Best Management Practices for the Production of Turkeys Dec. 1995, 10: "Ammonia in the air is absorbed into the blood of turkeys and causes immunosuppression. It prevents phagocytosis of E. coli organisms in the blood and suppresses the lysis of E. coli organisms within the macrophage cells."
75. "Consumers should remember that 'downgrading' often applies only to the visual aspect of slaughtered birds, and birds deemed at least in part fit for human consumption may have suffered from the raw wounds of ulcers, ammonia blindness and many other painful conditions. Chicken pieces, or portions, are often the salvaged parts of injured birds—severe bruising or breast blisters may condemn one part of the chicken to the processed or pet food trade, while the legs, for example, even if broken, will be packaged up for the supermarket" (Druce, Chicken and Egg, 20). For U.S. government regulations on what may be sold for human consumption, see Title 9 Code of Federal Regulations: Animals and Animal Products.
76. Hugh J. Hansen and Charles M. Fischer, "Control Measures for Ammonia in Broiler Brooding Houses," Paper No. 86-4029 American Society of Agricultural Engineers (1986): 1. Charles C. Ross and Wayne D. Daley, "Ammonia Sensing in Broiler House Environments," Paper No. 86-4044 American Society of Agricultural Engineers (1986): 1.
77. Carlile, 1.
78. William D. Weaver and R. Meijerhof, "The Effect of Different Levels of Relative Humidity and Air Movement on Litter Conditions, Ammonia Levels, Growth, and Carcass Quality for Broiler Chickens," Poultry Science 70 (1991): 746-755. See esp. 746-749, 752. See also Druce, Chicken and Egg, 1820.
79. Baskin, 38. See note 1 above.
80. Stan Curtis, an animal scientist, quoted in Myths and Truths About Modern Poultry Production n.d., 4.
81. This is obvious, but for a scientific discussion, see, e.g., "Social Behavior Effects on Spacing," in Craig, Domestic Animal Behavior, 32-53. A clear view on chickens' need for open space is provided by Smith and Daniel, 272, 337.
82. Poultry Digest June 1990: 4. "Companies in some areas clean out once every five years" (Broiler Industry May 1996: 27).
83. J. Stephen Pretanik, letter to Dana Burger, Aug. 13, 1992.
84. North and Bell, 456.
85. North and Bell, 457.
86. Cobb Broiler Manual, Cobb, Incorporated, n.d., 6.

87. Poultry Digest May 1990: 44.
88. These misperceptions are epitomized in Baskin, 38, 41.
89. van der Sluis, "Layers Out Of and Broilers Into Cages?" World Poultry 9.11 (1993): 10-13. William A. Dudley-Cash, "Commercial cage rearing of broilers should not be ignored,"' Feedstuffs March 6, 1995: 11, 19.
90. van der Sluis, 12.
91. van der Sluis, 12.
92. Farmer Automatic of America, Inc. at the International Poultry Exposition, Jan. 19-21, 1994.
93. "If you have 60,000 in two houses with a five percent death loss, then you have 3,000 to dispose of. . . . Who takes the loss if thousands die right before slaughter size due to an ice storm, sub-zero periods, hot spell, disease outbreaks, etc.?" "'Deep Throat Chicken' just keeps on clucking," The Local (Franklin, Kentucky) July 20, 1994: 2. The point was raised during a successful campaign by residents of Simpson County, KY, in 1994, to keep Cagle's, a broiler chicken company, out of the County. See also "Scientists tackle dead bird disposal," Today's Marketplace (A Special Publication of The Ledger Newspapers, Lancaster County, PA) June 8, 1996: 4: "Poultry mortality rates from disease and other causes can reach 5 percent for broilers and up to 7 percent for layers. Nationally, more than 360 million birds weighing a combined 470,000 tons die prematurely each year. Hatchery waste, including eggshells, unhatched eggs and dead birds, presents a similar disposal problem. . . . And because dead birds often have viruses or bacteria, transporting them could spread diseases to other farms."
94. We saw this everywhere during our visit through Tyson and Perdue chicken houses in Maryland in February 1992.
95. "Most mortalities, especially for poultry and young swine, are currently being buried in pits, incinerated or placed in landfills." R. Brown, "North Carolina starts center to investigate animal waste uses," Feedstuffs May 29, 1996: 12. See also R. Smith, "Chicken producers on Delmarva begin composting to help ease pressure on peninsula's water quality," and "Growers call composting important management tool," Feedstuffs Sept. 10, 1990: 1, 30-32. A problem with dead bird composting is that it allows nitrate residue to go back on the land. See Sharon Morgan, "Chicken disposal idea wins national award," The Delmarva Farmer Feb. 26, 1991: 1, 8.
96. Sanctuary News, the quarterly newsletter of Farm Sanctuary, Watkins Glen, NY (Fall 1993): 6.
97. Commercial Chicken Production, prod. University of Delaware, Oct. 9, 1989 (57 min.).
98. John Robbins, Diet for a New America (Walpole NH: Stillpoint Publishing, 1987), 69.
99. Title 9 Code of Federal Regulations 381.76-93, Subpart K—Post Mortem Inspection; Disposition of Carcasses and Parts. This part of the Code describes poultry inspection procedures.
100. Fowler. See Chapter 2, note 70.
101. The link between antibiotics and water retention is cited in a promotional pamphlet, "The Good Old Fashioned State of the Art," Shelton's Poultry, Pomona, CA: "Antibiotics, given in small doses, cause a bit of water retention, raising the weight of the bird and thus cutting 15% off of the growing time."
102. "Poultry Irradiation and Preventing Foodborne Illness," FSIS Backgrounder, U.S. Dept. of Agriculture Food Safety and Inspection Service, May 1992; Revised Sept. 1992. Alan Ismond, P. Eng, "Irradiation's not the solution," Letters, Meat & Poultry Dec. 1995: 4. Zack Stentz, "Salmonella: The other enemy," Meat & Poultry Dec. 1995: 26-29. R. Brown, "Robots may assist in chicken processing line," Feedstuffs April 29, 1996: 14. Scott M. Russell, "The FSIS Pathogen Reduction

Proposal," Broiler Industry Feb. 1996: 16-24.
103. Rick Weiss, "President Orders Overhaul of Meat Safety Inspections," The Washington Post July 7, 1996: A1, A10.
104. William H. Dubbert, "Efforts to Control Salmonella in Meat and Poultry," Third Poultry Symposium Proceedings: Managing for Profit, ed. Robert E. Moreng (Fort Collins, CO: Colorado State University, 1987), 142. See also Russell, 24 (note 102 above).
105. Devine, 40. See Chapter 3, note 136.
106. American Rivers, North America's Most Endangered and Threatened Rivers of 1997, Annual Report, April 1997, p. 17. For complete Report: (202) 547-6900; www.amrivers.org/amrivers/

Chapter Five THE DEATH

1. Baskin, 40.
2. Livestock Slaughter: 1995 Summary, Washington, D.C.: National Agricultural Statistics Service, U.S. Dept. of Agriculture, March 1996: 1. Poultry Slaughter, Washington, D.C.: NASS, U.S. Dept. of Agriculture, April 4, 1996: 15-16. Reported figures for 1995: 35.6 million cattle; 1.43 million calves; 96.3 million pigs; 4.56 mil lion sheep and lambs; 7,371,429 young broiler-fryer-roaster chickens; 159,418 mature chickens (breeders and layers); 19,528 ducks; and 281,032 turkeys.
3. For "marketings" (slaughter) ranging from 121 million to 147.7 million broiler chickens per week in the U.S., see the Livestock and Poultry reports in Feedstuffs May 10, 1993: 26; Feedstuffs Aug. 23, 1993: 30; Feedstuffs Aug. 26, 1996: 30.
4. "First reading for broiler welfare bill," The Veterinary Record (April 6, 1996): 317. In a 5-page paper, Welfare of Poultry at Slaughter, Oct. 1991, Peter Stevenson of Compassion in World Farming (UK) gives the following slaughter statistics for 1990 in Britain: 600 million chickens, 34 million turkeys, and 10 million ducks.
5. Kienholz, unpublished letter to the National Enquirer, March 3, 1993.
6. Chickens and Eggs, Washington, D.C.: NASS, U.S. Dept. of Agriculture, Jan. 31, 1996: 2.
7. "Approximately 40 million layer hens are slaughtered in Britain every year. The majority come from battery cage units and are culled towards the end of their laying period when they are usually between 72 and 76 weeks old." N.G. Gregory and L.J. Wilkins, "Broken Bones in Domestic Fowl: Handling and Processing Damage in End-Of-Lay Battery Hens," British Poultry Science 30 (1989): 555.
8. Poultry Slaughter, 10, 12. See note 2 above. E.g., in February 1996, 6,780,214 young chickens and 742,260 mature chickens were condemned post-mortem in selected states. The largest number of condemnations was for septicemia (blood poisoning) comprising 2,213,335 young chickens and 301,651 mature chickens.
9. A.W. Brant, et al., Guidelines for Establishing and Operating Broiler Processing Plants, Agricultural Handbook Number 581, Washington, D.C.: Agricultural Research Service, U.S. Dept. of Agriculture, May 1982, 23.
10. Bronstein, "There's a catch to catching birds: It's hazardous to the health," The Atlanta Journal-Constitution June 2, 1991: D4.
11. Clark, "The dirt, the smell—the pay cut: A tough job just got worse," The Sun (Baltimore, MD) April 6, 1992: 1A, 10A. The quotation is from 10A.
12. Mark Mathew Braunstein described this head-bashing to me from his experience of working as a chicken-catcher on a kibbutz in Israel.
13. N.G. Gregory and S.D. Austin, "Causes of trauma in broilers arriving dead at poultry processing plants," The Veterinary Record 131 (Nov. 28, 1992): 502-503.
14. Baskin, 40.
15. Clark, 10A.
16. Quoted in Druce, Chicken and Egg, 1.

17. Matthew Clarkson, "6-ton harvester gently counts, boxes 7,000 chickens per hour," New Hampshire Business Review April 1, 1993: 1.
18. Michael Lacy, "Mechanized Catching of Broilers," North American Symposium on Poultry Welfare, Edmonton, Alberta, Aug. 13, 1995. Dr. Lacy, a poultry researcher at The University of Georgia, found this amusing, "a neat fountain of chickens shootin' up into the air."
19. Bruce Hotchkiss, "Rural Ramblings: 'Chickens are uncooperative,'" The Delmarva Farmer Nov. 3, 1992: 12.
20. Gregory and Austin, 502. See note 13 above.
21. Gene Bruce, "Public Health: Dirty Chicken," The Atlantic Nov. 1990: 34. See also Wolfson: "In Pennsylvania 'it shall not be deemed cruel or inhumane to transport live poultry in crates so long as not more than 15 pounds of live poultry are allocated to each cubic foot of space in the crate.' This is approximately four birds per cubic foot" (9).
22. "Notes from Chickens' Lib re: queries in your letter of 31 Nov. 1990," letter to the author, n.d. According to a researcher, "Normal [caged] layers will lose 10-15 per cent of their feathers by 40 weeks of age, 20-25 per cent by 55 weeks, and up to 40 per cent by 75 weeks of age. . . . The energy requirement of completely defeathered birds is about 85 per cent greater than that of normally feathered birds." Michael Elliot, "Poorly feathered hens eat more feed," Poultry Digest Aug. 1994: 27.
23. Diseases of Poultry, 8th ed., 744.
24. D. S. Mills and C. J. Nicol, "Tonic immobility in spent hens after catching and transport," The Veterinary Record 126 (March 3, 1990): 212.
25. Phelps, "U.K. scientists call for redesign of broiler trucks," Feedstuffs Dec. 3, 1990: 21.
26. Barb Goethe, letter to the author, March 26, 1994. The suffering of chickens in transport is discussed in economic terms in Bowers, "Live Haul Causes Yield Loss," Poultry Marketing & Technology Dec./Jan. 1994: 32.
27. However, during the 1930s, chickens transported in railroad cars from North Carolina to New York City were given food and water to keep them marketable (The Poultry Tribune, Sept. 1995: 6). According to Broiler Industry (July 1976), truckers dropped wet mash into live poultry trucks making long journeys (50, 52).
28. Guidelines, 23. See note 9 above.
29. Webster, et al. See Chapter 3, note 134.
30. Bob Fliss, "Salmonella increase linked to shipping," Southern Poultry Oct. 1993: 15.
31. John Painter Jr., "How did the chickens cross the road? Well-scrambled," The Oregonian Jan. 19, 1993: A1-A14.
32. Michael D. Shear, "I-95 Traffic Gets All Fowled Up," The Washington Post Aug. 25, 1995: C3.
33. John W. Fountain, "Chickens Come First in Her Pecking Order," The Washington Post Aug. 31, 1995: C3.
34. Federal Laboratory Animal Welfare Act, Title 7 U.S. Code, Sections 2131-2156. Detailed Regulations and Enforcement: Title 9 Code of Federal Regulations, Parts 1-4. For discussions of the Animal Welfare Act, see The Animals' Advocate: Investigating Animal Abuse (Rockville, MD: Animal Legal Defense Fund, Inc., 1987); Animal Welfare Institute, ed., Animals and Their Legal Rights (Washington, D.C.: Animal Welfare Institute, 1990), chapter 4; and Gary L. Francione, Animals, Property, and the Law (Philadelphia: Temple University Press, 1995), chapter 9.
35. Twenty-Eight Hour Law, Title 45 U.S. Code, Sections 71- 74. Detailed Regulations: Title 9 CFR, Part 89. Discussions of this law can be found in The Animals' Advocate, part C; and Animals and Their Legal Rights, chapter 2. See note 34 above.
36. According to Broiler Industry (July 1976), the first commercial shipment of baby

chicks took place in 1892 by rail from Rosemont, New Jersey to East Orange, New Jersey (84). This started the vast mail order chick business led by Sears, Roebuck (84). For regulations on the mailing of chicks, see the Domestic Mail Manual C022. Sections 3.0-3.1 refer to chicks and other live animals as "perishables." "Live Day-Old Poultry"—chickens, ducks, geese, partridges, pheasants, guinea fowl, quail, and turkeys, etc.—"can be delivered to the addressee within 72 hours of the time of hatching." People for the Ethical Treatment of Animals provides an information packet on the transport of live chicks.

37. The president of Stair Cargo Services told a traveller in Miami, Florida that mass suffocation of baby chicks at the warehouse is standard practice if the buyer fails to appear. "He said his usual practice to destroy the chicks was by placing them in plastic bags and suffocating them with the help of a fire extinguisher." William Merritt Eckert, letter to PETA Investigation Division, Jan. 11, 1993.
38. "Research at Iowa State examines comforts for farm animals," Feedstuffs April 15, 1996: 15.
39. Joanne Stefanatos, D.V.M., letter To Whom It May Concern, March 10, 1995. Dr. Stefanatos has been Nevada's Wildlife Veterinarian since 1972..
40. Farm Animal Welfare Network, "Poultry Transport— Unimproved?" Fact Sheet 34, Feb. 1993: 1.
41. "Sad Journeys to Slaughter," Agscene 99 (May/June 1990): 17.
42. Quoted in Harriet Schleifer, "Images of Death and Life: Food Animal Production and the Vegetarian Option," In Defense of Animals, ed. Peter Singer (New York: Basil Blackwell, 1985), 63.
43. On October 18, 1991, I toured this former Holly Farms plant which, at the time, slaughtered 200,000 broiler chickens a day. We began in a packing room filled with boxes of frozen chicken parts labeled for shipping to Russia and proceeded through the various stages to the loading dock where birds who fell onto the cement were pulled back by workers using long-handled hooks. We stood beside the shackled baby birds in the dark red room designed to "calm" them in preparation for the intense suffering that awaited them in the water bath "stunner" and beyond.
44. The average electrical current of 12.5 mA per bird does not come close to the level of current required to render a chicken unconscious. See below.
45. Humane Methods of Slaughter Act, Title 7 U.S. Code, Sections 1901-1906. Detailed Regulations and Enforcement: Title 9 CFR, Part 313, Sections 313.1-313.90.
46. Title 9 CFR: Animals and Animal Products, Subpart I-Operating Procedures. 381.65c. In fact, the bleeding is not thorough. As explained by G.B.S. Heath in "The Slaughter of Broiler Chickens," [S]ince a large percentage of the blood of the chicken's body is located in the small veins and capillaries, much of the blood [at least half] remains in the body of the bird after death." World Poultry Science Association Journal 40.2 (June 1984): 151.
47. According to the U.S. Dept. of Agriculture's Guidelines for Establishing and Operating Broiler Processing Plants, "A bird that has been missed in the killing process will have a distinct red skin indicating a cadaver. Cadavers, if they occur, should not exceed more than 1 or 2 birds per 1,000 slaughtered" (24). In Fiscal Year 1993, of 7,085,491,852 total poultry slaughtered in USDA inspected establishments, 3,121,617 birds officially entered the scald tank alive (Freedom of Information Act #94-363, Poultry Slaughtered, Condemned, and Cadavers, June 30, 1994).
48. See "The privilege of slaughter by ritual" (46) in Annabelle Birchall, "Kinder ways to kill," New Scientist May 19, 1990: 44-49.
49. Kristin Huckshorn, "The Burden of the Last Muslims,'' San Jose Mercury News May 19, 1995: 1A, Back Page.

50. Farm Sanctuary, Humane Slaughter? (9.16 min.).
51. S.F. Bilgili, "Electrical Stunning of Broilers-Basic Concepts and Carcass Quality Implications: A Review," The Journal of Applied Poultry Research 1.1 (March 1992): 135-146. See 136.
52. Bilgili, 139.
53. Bilgili, 136.
54. Bilgili, 142.
55. Bilgili, 140-141.
56. "The abdominal fat tissue had the greatest resistivity of all tissues measured. The high variation observed in resistivity of the skull bone indicates that birds with thick and dense skull bones [e.g. spent laying hens and breeding fowl, because of their age] are most likely to be inadequately stunned" (Bilgili, 141).
57. H. Russell Cross, Administrator, U.S. Dept. of Agriculture, Food Safety and Inspection Service, letter to the author, Aug. 24, 1992: "[W]e do not maintain a list of methods that the Department considers acceptable for the humane slaughter of poultry, nor do we have a bibliography of available references that demonstrate findings that birds are effectively stunned before slaughter. The statement that 'birds are effectively stunned before slaughter' is based on observations of Food Safety and Inspection (FSIS) personnel."
58. George E. Heath, et al., "A Survey of Stunning Methods Currently Used During Slaughter of Poultry in Commercial Poultry Plants," The Journal of Applied Poultry Research 3.3 (Fall 1994): 297-302.
59. Statement of Mr. Michael R. Taylor, Administrator, Food Safety and Inspection Service, U.S. Department of Agriculture, Before the Subcommittee on Livestock of the Committee on Agriculture, House of Representatives, September 28, 1996.
60. Bowers, "Look Beyond the Obvious," Poultry Marketing & Technology June/July 1993: 16.
61. "Bloody bird," referring to internal hemorrhages, was the term used by Wayne Kuenzel (poultry researcher, University of Maryland, College Park) in a telephone interview with the author, Oct. 7, 1993. See also Bilgili, 142.
62. Bowers, "A Diagnostic Dilemma," Poultry Marketing & Technology Aug./Sept. 1993: 18-19.
63. N.G. Gregory and S.B. Wotton, "Effect of Stunning on Spontaneous Physical Activity and Evoked Activity in the Brain," British Poultry Science 31 (1990): 215-220. See esp. 219.
64. Wayne Austin, Simmons Engineering Company, letter to Clare Druce, Feb. 1, 1994 re: stunning and killing technology used in North America. "The typical amperage used in stunning by our pulsating direct current pre-stunner is approximately 12 to 15mA. . . . In our shortest pre-stunner, there would be 16 birds in contact; in our longest pre-stunner, there would be 24 birds in contact. If the reading is 200mA, with 16 birds in contact, there would be an average of 12.5mA per bird." According to Kuenzel, "Stunner voltage should be 24-35 volts. Each individual bird receives 15 mA" (phone interview with the author, Oct. 7, 1993). Bilgili states, "If the total current is one ampere (1000 miliamperes; mA), and all birds are assumed to have similar resistance, the current flowing through each bird will be: 1000/20=50 mA/bird (139).
65. Gregory, "The physiology of electrical stunning and slaughter," Humane Slaughter of Animals for Food Potters Bar, UK: Universities Federation for Animal Welfare, 1987), 3-14.
66. Euthanasia of Dogs and Cats: An Analysis of Experience and Current Knowledge with Recommendations for Research, World Federation for the Protection of Animals, Special Report/April 1977: "In 1928-29, the Nobel laureate, Professor A.V. Hill, reported that the [electrocution] cabinets [in use for dogs and cats in

1926] were likely to cause great pain although this would be masked by muscular paralysis. . . . [T]he results of American research were adding force to those who continued to have doubts. Their fear was that the quiet, relaxed, supposedly unconscious or dead animal was, in fact, fully conscious and in agony for some time before unconsciousness and death supervened" (12). The 1993 Report of the AVMA Panel on Euthanasia states, "For death to be painless and distress-free, unconsciousness should precede loss of motor activity (muscle movement). This means that agents that induce muscle paralysis without unconsciousness are absolutely condemned as sole agents for euthanasia" (234). (Rpt. from the Journal of the American Veterinary Medical Association 202.2, 1993: 229-249.

67. For an overview, see the equivocal article by Freeman Boyd, "Humane Slaughter of Poultry: The Case Against the Use of Electrical Stunning Devices," Journal of Agricultural and Environmental Ethics 7.2 (1994): 221-236.
68. Gregory, letter to the author, Jan. 11, 1993. Chickens smell blood. See Rogers: "The responses of chicks to the odour of blood fall into the category of natural behaviours. . . . Blood from a conspecific induced avoidance and fear behaviour in the chicks" (109)
69. "Whether you discuss turkeys, guineas or broilers . . .[s]tunning should achieve temporary immobilization and not kill the bird." Wabeck, "How stunning affects product quality," Turkey World July/Aug. 1987: 34.
70. Boyd, 223.
71. Bowers, "A Diagnostic Dilemma," 18.
72. Bowers, "Look Beyond the Obvious," 18.
73. Kuenzel. See note 61 above. As if all this were not enough, the U.S. Food and Drug Administration is reviewing an application for the use of super glue (cyanicrylate adhesive) to seal the vents of poultry at slaughter "to prevent the birds from reflexively excreting fecal material at the time of death" (Food Chemical News April 24, 1995: 12)
74. [N.G. Gregory], A Practical Guide to Neck Cutting in Poultry, Meat Research Institute Memorandum No. 54, Agricultural and Food Research Council, Langford, Bristol, UK, Aug. 1984. 8 pp. See 2.
75. "Poultry Slaughter - Less Suffering in Sight?" Agscene 105 (Winter 1991): 20.
76. A Practical Guide to Neck Cutting in Poultry, 24.
77. A Practical Guide, 5.
78. Watts and Connor, Poultry Tribune Sept. 1995, 7.
79. A Practical Guide, 2, 6.
80. Title 7 U.S. Code, Section 1902(b).
81. Birchall, 46.
82. Dr. Joe Regenstein of Cornell University faxed me the relevant pages of this Guide issued by Gov. Cuomo (NY) and Richard Kessel (New York State Consumer Protection Board) and written by Micheline Ratzersdorfer, Joe Regenstein, and Laura Letson describing visits to both a kosher and a non-kosher poultry slaughter plant.
83. Birchall, 46. For video documentation of this kind of handling of chickens, see Humane Slaughter? produced by and available from Farm Sanctuary in Watkins Glen, New York.
84. See Chapter 3, note 12. G.E. Heath, et al., 299, give electrical stunning statistics based on a USDA survey of federally-inspected poultry slaughter plants in 1991. E.g., 92% young broiler chickens vs. 6% light fowl, i.e. spent laying hens. See note 55 above.
85. Gregory, letter. See Gregory and L.J. Wilkins, "Broken Bones in Domestic Fowl: Handling and Processing Damaging in End-of-Lay Battery Hens," British Poultry Science 30 (1989): 555-562.

86. Bilgili, 141.
87. Gregory, letter. Birchall, 47-48.
88. Testimony of Dr. Alice Johnson, Director of Regulatory Affairs, American Meat Institute, House Subcommittee on Livestock, Sept. 28, 1994.
89. "Gas Stunning," Agscene 115 (Summer/Autumn 1994): 22.
90. Birchall, "Kinder ways to kill." See note 48 above.
91. Birchall, 47.
92. A.R. Gerrits, "Method of Killing Day-Old Chicks Still Under Discussion," World Poultry 11.9 (1995): 28.
93. Gentle, "Pain in Birds," Animal Welfare 1 (1992): 235-247.
94. Gentle, 235. He concludes: "The close similarity between birds and mammals in their physiological and behavioural responses to painful stimuli would argue for a comparable sensory and emotional experience, but is this inference valid? Pain is a subjective experience and the subjective experiences of a bird may be very different from humans. Birds do [,] however, have the physiological, biochemical and anatomical mechanisms similar to those that in the human are known to be correlated with painful experiences" (243).
95. Assembly Bill No. 1000, Chapter 837, 1991, amended Section 19501 of the Food and Agricultural Code by adding Section 19501.5 to require humane slaughter of poultry and to adopt regulations to implement the provisions which prescribe methods by which livestock are to be slaughtered in relation to poultry.
96. See Chapter 3, note 12. The Humane Poultry Slaughter Bill, introduced on March 4, 1991 by Assembly Member Dan Hauser, originally included all poultry, but was subsequently amended to "include poultry, except spent hens and small game birds."
97. The Humane Slaughter of Poultry Regulations, Title 3 CA Code of Regulations, Article 15.1, Section 1245.1-1245.16. Section 1245.16(b)(c) subverts the purpose of the law. The regulations went into effect (whatever this means in practice) on Dec. 14, 1996.
98. These bills were introduced by Rep. Andrew Jacobs, Jr. (Indiana). They include H.R. 4124, Humane Methods of Poultry Slaughter Act of 1992, introd. Jan. 28, 1992; H.R. 649, Humane Methods of Poultry Slaughter Act of 1993, introd. Jan. 27, 1993; and H.R. 264, Humane Methods of Poultry Slaughter Act of 1995, introd. Jan. 4, 1995.
99. Harold L. Volkmer (D-Missouri), Chairman of the House Agriculture Subcommittee on Livestock, held a hearing on September 28, 1994, on H.R. 649, the Humane Methods of Poultry Slaughter Act. United Poultry Concerns, the Animal Legal Defense Fund, and the Animal Welfare Institute presented oral and written testimony on behalf of H.R. 649. During the hearing, Mr. Volkmer joked about killing chickens in his youth and announced his opposition to the bill.
100. Petition for Rulemaking Regarding Regulations Issued Under the Poultry Products Inspection Act (PPIA), 21 U.S.C. Sec. 451, et seq. was submitted before the U.S. Department of Agriculture on November 21, 1995, by the Animal Legal Defense Fund, the Society for Animal Protective Legislation, and the Animal Welfare Institute.

Chapter Six A NEW BEGINNING

1. Rogers, 213.
2. Isaac Bashevis Singer, foreword, Vegetarianism: A Way of Life, by Dudley Giehl (New York: Harper & Row, 1979), vii-i. "All their nice talk about humanism, a

better tomorrow, a beautiful future, has no meaning at all as long as they kill to eat or kill for pleasure. . . . Even if God or nature sides with the killers, the vegetarian is saying: I protest the ways of God and man" (viii).

3. Plutarch (46?-120? A.D.) was a Greek philosopher and historian. This quotation from Plutarch's Moralia appears in Jon Wynne-Tyson, ed., The Extended Circle: A Dictionary of Humane Thought (Fontwell Sussex, UK: Centaur Press, 1985), 249.
4. As summarized in Craig, Domestic Animal Behavior, "The fitness of an animal under domestication is determined largely by whether it pleases its owner enough that it is allowed to survive to maturity and reproduce" (27); and in Smith and Daniel, "Betty MacDonald [author of The Egg and I] found only one saving element in the chicken business: 'If a hen is lazy or uncooperative or disagreeable you can chop off her head'" (270).
5. See the section on forced molting in Chapter 3 above.
6. See Wolfson, Beyond the Law, 3-4, 12-20. See generally Francione, Animals, Property, and the Law.
7. Ian Elliott, "Aquaculture experts say output must triple to meet demand," Feedstuffs April 29, 1996: 10-11.
8. See Elliott: "The only way to meet increasing demand is to boost output by raising fish just as farmers produce livestock, poultry and plants" (10). See also Luther Young, "UM [University of Maryland] gene-splicers say they see progress in 'redesigning' fish to grow faster, bigger," The Sun (Baltimore, MD) Jan. 6, 1991: 1B, 3B. See also R. Brown, "Dwindling supply of wild seafood to boost aquaculture"; "Researchers say biological product cuts pond ammonia"; "Aquaculture studies use of immune system stimulants"; "Arkansas researchers warn caged catfish not profitable," Feedstuffs May 29, 1995: 9-11. See also R. Brown, "EPA issues Sea Pride country's first ever mariculture permit," Feedstuffs July 31, 1995: 9.
9. Kathleen Leddy, Food Labeling Division, Food Safety and Inspection Service, U.S. Dept. of Agriculture, telephone interview with the author, Sept. 17, 1992.
10. See Title 9 CFR 381.115-144 (Subpart Labeling and Containers).
11. Dr. Hall Ricker, telephone interview with the author, Sept. 18, 1992.
12. Bart Ehman, telephone interview with the author, Sept. 16, 1992.
13. "Confusion and Rip-Off," Agscene 101 (Nov./Dec. 1990): 8.
14. Holly Cheever, D.V.M., letter to the author, Jan. 10, 1993.
15. Joseph Beck, telephone interview with the author, Sept. 18, 1992.
16. Gene Newberry, Deputy Director of the Division of Regulatory Guidance, Food and Drug Administration, Sept. 21, 1992.
17. "the happy hen Organic Fertile Brown Eggs," flyer.
18. On June 24, 1992, Joe Moyer, the owner of Pleasant View Egg Farm in Winfield, PA, of which "The Happy Hen," is a division, provided a tour.
19. Food Animal Concerns Trust, Standards for Nest Eggs Production, Revised October 7, 1991. Forced molting (See Chapter 3) is a normal practice of free-range egg production. Examples are "The Happy Hen," discussed above, and the "Cage-Free Eggs" of Norco Ranch, Norco, California.
20. Our hen, Lettie, lived to be 14 years old. See Smith and Daniel, 326-327.
21. As Joe Moyer explained during our tour of "The Happy Hen." His "free-range" broiler chickens are trucked to slaughter at L & L Pheasantry in Hegins, Pennsylvania, the town that sponsors the Labor Day Pigeon Shoot each year.
22. "Egg-type chicks hatched are comprised of all chicks of egg-type domesticated breeds including males and chicks destined for hatchery supply flocks and research purposes." Chickens and Eggs, Washington, D.C.: National Agricultural Statistics Service, U.S. Dept. of Agriculture, Jan. 31, 1996.
23. According to Dr. Roger Olson, Maryland Dept. of Agriculture, "Layer egg

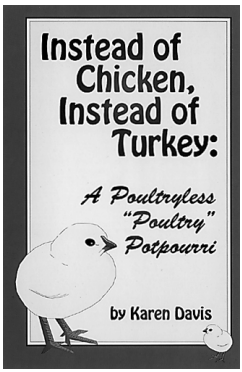
hatcheries would quite likely do this [sell male chicks to peddlers and pet stores]." Telephone interview with the author, Dec. 23, 1994.
24. Carol J. Adams and Marjorie Procter-Smith, "Taking Life or 'Taking on Life'?: Table Talk and Animals," Ecofeminism and the Sacred (New York: Continuum, 1993), 305.
25. Fox, 205-206. See Chapter 1, note 49.
26. Fox, 208.
27. Dr. Ian Duncan said this in a speech. See Chapter 3, note 94.
28. Rogers, 218.
29. Adams and Procter-Smith, 302.
30. Consortium Executive Committee, Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching, 1st ed. (Washington, D.C.: National Association of State Universities and Land-Grant Colleges, 1988).
31. Guide for Care and Use, 5.
32. Guide for Care and Use, 5.
33. Craig Coon (University of Minnesota, St. Paul), telephone interview with the author, July 25, 1994. See Alfredo Peguri and Craig Coon, "Effect of Feather Coverage and Temperature on Layer Performance," Poultry Science 72 (1993): 1318-1329. The authors get cute: "The sheared areas of the hens had no feather coverage, however, they tended to have a white, fuzzy look because the stub for the feather quill remained with the skin" (1319).
34. D.A. Roland, Sr., et al., "Toxic Shock-Like Syndrome and Its Relationship to Shell-Less Eggs," Poultry Science 63 (1994): 791-797.
35. Roland, 791-792.
36. Roland, 793.
37. Bell and Kuney, 200-206. See Chapter 3, note 122.
38. Bell and Kuney, 200, 206.
39. Richard L. Adams, 212-220.
40. Adams, 212.
41. Randy Wise, telephone interview with the author, Feb. 10, 1992.
42. Red Contact Lenses for Chickens: A Benighted Concept (Potomac, MD: United Poultry Concerns, Inc., 1992).
43. Karen Weber, letter To Whom It May Concern, April 15, 1991. In her follow-up letter to me, July 7, 1991, Weber said, "I have seen them rub their heads repeatedly on their wings."
44. E.g., a Cal Poly employee wrote to me concerning the hens' eye infections, Feb. 25, 1992: "An item not mentioned in your report is that the technician from Animalens sent to insert lenses and train others to insert lenses failed to wash her hands."
45. Steve Mattos, quoted in David Bock, "Animal rights groups address allegation of abuse in Poultry Unit," Mustang Daily June 6, 1991: 9.
46. Nedim C. Buyukmihci, V.M.D. Robert Lucas, Associate Vice President, Graduate Studies and Research, wrote to me on April 3, 1992, "I have considered further your request that [the] experimental chickens be released to the care of Dr. Buyukmihci. . . . I do not see sufficient cause for the university to modify its position on this matter." On July 25, 1991, we removed four experimental hens and took them to Dr. Buyukmihci for an ophthalmic examination and permanent sanctuary.
47. Jan Greene, "Animal rights groups blast contact lens study," Telegram-Tribune (San Luis Obispo County) April 3, 1992: A-6.
48. Lucas, letter to the author, April 3, 1992; Greene, A6.
49. Greene, A-6.
50. See Chapter 5, note 34.

51. Dale F. Schwindaman, Deputy Administrator, Regulatory Enforcement and Animal Care, Animal and Plant Health Inspection Service, U.S. Dept. of Agriculture, letter to the author, May 6, 1994.
52. Rogers, 217.
53. Regarding the exclusion of birds from the Animal Welfare Act, Rogers states: "[T]he assumption that birds are not as highly evolved as mammals . . . is incorrect" (letter to the author, April 28, 1996).
54. Schwindaman, letter to the author, Sept. 2, 1994.
55. "You may be aware that the Appellate Court has dismissed the case against the U.S. Department of Agriculture with regard to the regulation of rats, mice, and birds for lack of standing of the plaintiffs. Since Federal resources continue to be reduced, and we are experiencing a downsizing of government, we have no plans to regulate birds under the AWA at this time" (Schwindaman, letter to the author, June 7, 1994).
56. See Chapter 4 in Francione, Animals, Property, and the Law: "The Exclusion of Animal Interests from Legal Consideration—the Doctrine of Standing," 65-90.
57. For a detailed discussion, see Francione, Animals, Property, and the Law.
58. Joe Bob Briggs, "For Chickens, It's Home, Home on the Free Range," Telegram-Tribune (San Luis Obispo, CA) March 25, 1993: 24.
59. Joy Mench, University of Maryland, College Park, MD, Aug. 10, 1992.
60. Yes, we would. History is full crimes against the vulnerable and those "we decided we could use." See, e.g., Russell Watson, et al., "Crimes and Misdemeanors," Newsweek March 27, 1995: 43; and Laurie Wilson, "Family of Radiation Test Victim Angered by Government's Deceit," The Washington Post Jan. 2, 1994: A16.
61. Henry Spira, "Animal Rights: The Frontiers of Compassion," Peace & Democracy News 7.1 (Summer 1993): 11-14. See 12.
62. Luttmann, 101. See Chapter 2, note 44.
63. "I can assure you that the animal welfare issue (a) will not disappear, and (b) cannot be solved by public relations alone. There is a danger that if this nettle is not grasped, animal agriculture will be seen as ethically challenged or morally handicapped" (Duncan, 6). See Chapter 3, note 94.
64. The U.S. Dept. of Agriculture and the poultry industry sponsored the First International Symposium on the Artificial Insemination of Poultry June 19-22, 1994, at the University of Maryland, College Park, MD. It focused on "the single most powerful technique a commercial breeder has for managing the genetic progress of poultry." See M.R. Bakst, G.J. Wishart, eds., Proceedings: First International Symposium on the Artificial Insemination of Poultry (Savoy, Illinois: The Poultry Science Association, 1995).
65. Dudley-Cash, "Latest research findings reported at annual poultry science meeting," Feedstuffs Sept. 7, 1992: 11.
66. Burruss. See Chapter 1, note 55.
67. Smith and Daniel, 334.

INDEX

Ask your store to carry these books

20-Minute Almost No-Fat Cookbook $12.95
Becoming Vegetarian 15.95
Chef Neil's International Vegetarian Cookbook 5.00
Dietitian's Guide to Weight Control,
Better Health, & Longer Life 14.95
Ecological Cooking: Recipes to Save the Planet 10.95
Fabulous Beans 9.95
Foods that Cause You To Loose Weight 12.95
Holiday Diet Book 9.95
Instead of Chicken, Instead of Turkey by Karen Davis 9.95
Lighten Up with Louise Hagler 11.95
Peaceful Palate 15.00
Shoshoni Cookbook 12.95
Solar Cooking 8.95
Soyfoods Cookery 9.95
The Sprout Garden 9.95
Table for Two 12.95
Uncheese Cookbook 11.95
Vegan Vittles 12.95
Vegetarian Cooking For People With Diabetes 10.95



INSTEAD OF CHICKEN INSTEAD OF TURKEY

by Karen Davis

Over 100 egg- and dairy-free vegetarian recipes that duplicate and convert traditional poultry and egg dishes to satisfy the taste buds without destroying the birds.

Try eggless omelets, muffins, mayonnaise, eggless salads, cakes and cookies, pot pie, poultry-free "chicken" stew, and more.

You may order directly from:

The Book Publishing Company
P.O. Box 99 Summertown, TN 38483

Or call: 1-800-695-2241
Please add $2.50 per book for shipping