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Dr. Nancy Halpern, Director
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Re: Humane Treatment of Domestic Livestock
Proposed New Rules: N.J.A.C. 2:8
N.J.A.C. 2:8-4 sets forth the humane standards that must be met for the raising, keeping, care, treatment, marketing and sale of poultry.

Comments Submitted by Email and by Express Mail

Dear Dr. Halpern:

Thank you for the opportunity to comment on the proposed new rules pursuant to N.J.S.A. 4:22-16.1(a), which directs the Department of Agriculture to adopt "minimum standards for the humane raising, keeping, care, treatment, marketing, and sale of domestic livestock," as well as "rules and regulations governing the enforcement of those standards."

On behalf of United Poultry Concerns, a nonprofit animal protection organization, I am submitting the following comments regarding the proposed rules governing the care and treatment of poultry as outlined in Subchapter 4, Standards for Poultry, 2:8-4.1. I will address the following areas of concern to our organization including recommendations and references in each area: 1) transportation and food and water deprivation of "day-old" poultry; 2) forced molting of laying birds; 3) keeping of poultry; 4) beak trimming of poultry; 5) detoeing of poultry; 6) catching, carrying and removal of birds; and 7) concluding summary of our concerns

and recommendations.

I. Food and Water Deprivation and Transport of "Day-Old" Poultry

N.J.A.C. 2:8-4.2 and 2:4.3 state that each bird must have daily access to sufficient and nutritious feed and daily access to water to allow for growth and maintenance of an adequate body condition and to satisfy the bird's physiologic needs, with the exception that day-old poultry may be transported without food and water provided the birds are delivered within 72 hours of hatching, and food and water are provided immediately upon unloading in accordance with the US Postal Regulations that allow for three days (72 hours) of transport of newly hatched chicks without sustenance. The term "adequate" in reference to "body condition" is not defined and is therefore ambiguous until it is so defined. The suggestion that newly hatched birds may be "humanely" deprived of food and water for up to 72 hours—in addition to being subjected to air and ground transportation for that amount of time or longer—is not supported by the evidence. As the deprivation of sustenance is represented as an "exception" to the proposed standards, does this means that not even minimum humane standards apply to newly hatched birds?

The term "day-old" poultry is misleading because by the time a hatch is completed, many of the birds will have been out of their eggs for several hours or more. A study reported in the *Veterinary Record* concludes that "[a] consignment of 'day-old' chicks will therefore include individuals of different ages" (Warriss, et al., 1992:49). In North America, earlier hatching chicks can be held in the incubator for up to 36 hours after hatching and in the case of turkey poults, even longer (Warriss). In the Warriss study, newly hatched chicks kept for up to 48 hours without food or water, compared with chicks given access to food and water within six hours of hatching, suffered from "lost body water," and "demonstrated a stronger motivation to drink and drank more when offered water, suggesting that they were dehydrated." The study indicated that "significant weight loss can occur even after short periods of transport," a loss that has "implications for the chicks' welfare." Other research cited in the study "found that weight loss in day-old chicks kept without food and water increased with increasing ambient temperature and that the birds died when they had lost about 17 per cent of their initial weight."

Concerning variability in hatching time, North & Bell state that even under the best of mechanical incubation procedures, "about 32 to 35 hours elapse between the time the first and last chicks hatch." According to North & Bell,

> Most scientists agree that a chick should drink no later than 36 hours after hatching, but

> because some chicks are 32 to 35 hours old when removed from the hatcher, they will be more than 58 hours old when they reach the farm. . . . Although they can get along without water and feed for up to 3 days after hatching, such a delay will be detrimental. Any postponement only dehydrates and weakens them, and weak chicks do not learn to drink and eat as rapidly. For best results, chicks should be given water about 24 hours after they are hatched. (North & Bell, 1990, pp. 140, 238)

As noted in the proposed rules, the US Postal Service does not require senders of newly hatched birds to provide them with sustenance during transit. USPS transports birds to the airport and other destinations in vehicles and carriers that are not temperature-controlled, subjecting the newly hatched birds to freezing, sweltering, and fluctuating temperatures. The birds, defined as "perishable matter," are loaded, unloaded, knocked and banged around like the luggage and other inanimate items with which they are inhumanely classified by the US Postal Service. Jean Cypher, DVM, of the Avian Medical Center in Oswego, Oregon, explains that "[e]ven if ambient temperatures are mild, when chicks are crowded [as they invariably are in shipping containers], those in the center will be overheated and those at the edges will be chilled" (Letter, Feb. 16, 1995). Dr. Cypher's observations regarding the effect of food and water deprivation on newly hatched birds added to the effect of transportation are as follows. At the Avian Medical Center where she is on staff, Dr. Cypher writes, "[w]e treat neonatal birds daily. These range from parrots, songbirds and pigeons to domestic and wild fowl and farm birds such as ducks, pheasants, peafowl, chickens and ratites. In the latter groups, the most common illness we see is malabsorption of the yolk sac, usually stemming from problems in the nursery environment." Dr. Cypher continues:

> The USPS regulations on chick mailings seem to arise from the fact that the yolk sac is the neonate's main source of nutrition for the first 24-72 hours. But this is a fatally simplistic view of young birds' requirements. Most birds will not absorb their yolk unless kept in ideal hatchery conditions. It is difficult to imagine how these conditions can be maintained during postal transport. Even if ambient temperatures are mild, when chicks are crowded, those in the center will be overheated and those at the edges will be chilled. When the air around an individual chick remains below 85-90 degrees F, yolk absorption slows, causing hypoglycemia, reduced absorption of yolk immunoglobulins (immunodeficiency), starvation, and death. Above 95 degrees F, chicks become dehydrated and can no longer absorb their yolks. When distressed chicks are returned to an optimal environment, there has usually been irreversible, fatal damage to the kidneys and liver (from metabolism of the body's protein and fat stores). The intestinal tract also

slows, causing bacterial overgrowth in the bowel and attached yolk sac. Unabsorbed or infected yolks absorb fluids from the bloodstream and swell up, eventually rupturing. This may occur as late as the 7th to 12th day of life, well after the environment has been corrected. Similarly, if chicks are jostled, crushed or dropped, their yolks will leak or rupture. It can be a slow and painful death, like acute appendicitis.

Poultry and fowl also require visual stimulation in the first few days of life. They learn to eat and drink by watching the hen and other birds. In a dark box with no food or water, it is impossible for chicks to imprint correctly. Upon arrival, if they are not too weak to self-feed, they may be too old to learn. Fowl and poultry breeders call this "starve-out." In our practice we find that people don't realize that birds are a lot like mammals, just more delicate. A day-old chick can no more withstand three days in a dark crowded box than can any other newborn. In 1991, Lufthansa Airlines announced it would no longer accept birds as cargo, citing "a moral obligation to avoid this immense suffering."

Conclusion

The proposed rules and regulations on the treatment of "day-old" poultry with respect to food, water, and transport do not meet minimum humane standards of care for these birds. Minimum welfare standards should not be set aside for "day-old" poultry to accommodate commercial interests at the expense of the wellbeing of newly hatched birds.

- **United Poultry Concerns recommends that to ensure minimum welfare standards for newly hatched birds, food and water should be made available to each bird within four to six hours of hatching, transport of chicks should not exceed six hours, and air transportation of newly hatched chicks should be prohibited.**

References

Cypher, J. To Whom It May Concern. February 16, 1995.

North, M.O., and D.D. Bell. Commercial Chicken Production Manual, 4th edition. New York: Van Nostrand Reinhold, 1990.

Warriss, P. D., et al. 1992. Responses of newly hatched chicks to inanition. Veterinary Record 130:49-53.

II. Forced Molting, i.e. Food Deprivation, of Adult Poultry

N.J.A.C. 2:8-4.2 states that an exception to the feeding requirements for poultry is the withdrawal of food from "adult poultry" during an induced molt for a maximum length of 14 days starting when all feed troughs are empty, and that the birds may be deprived of food until they have lost up to and including 30 percent of what they weighed when their food was taken away from them.

The food deprivation practice commonly known as forced or "induced" molting of laying hens has been shown to induce significant systemic and infectious disease conditions in these birds. *Salmonella enteritidis* [SE], which has been identified as a major contaminant in shell eggs since the 1980s, has been scientifically linked to the practice of forced molting, making forced molting both a food safety and an animal welfare issue. The United Egg Producers Animal Welfare Advisory Committee summarized in 2000 that "[b]ehavioral and immune system measures indicate that the welfare of the hen is compromised when feed withdrawal or restriction is used to induce a molt" (Armstrong, 2000).

The practice of withholding food from laying hens from five to twenty-one days at a time, or until they lose 25 percent to 35 percent of their initial body weight (Webster, 2000:192), is currently done by 75 percent to 80 percent of the layer industry in the United States (Bell, 1999, p. 68). This practice has been shown to compromise the immune function of the birds so severely as to render their eggs a health risk to consumers as well as compromising the well-being of the birds. In particular, *Salmonella enteritidis* (SE) has been linked to forced molting; however, other pathologic changes in force-molted hens have also been identified. These changes, which do not normally occur in naturally molting hens, include a loss of 25 percent or more of body weight attributed to loss of weight "in body fat, feathers, liver tissue, musculature and skeleton" (Bell, 1996, p. 4). In studies, force-molted hens "shed significantly higher numbers of SE during the feed removal period than the unmolted group." Furthermore,

> Histological examination of cecum and colon from molted infected hens revealed inflammation compared with minimal changes in the intestines of unmolted infected hens. Molting, in combination with an SE infection, created an actual disease state in the alimentary tract of affected hens. (Holt & Porter, 1992:1842)

The USDA's Food Safety and Inspection Service (FSIS) has acknowledged that "public health concerns are raised by highly stressful forced molting practices [which] lead to increased shedding of Salmonella enteritidis (Se) by laying hens subjected to these practices" (Stolfa, 1998). In 1999, a General Accounting Office Report on food safety identified forced molting as a primary factor associated with increased levels of *Salmonella enteritidis* in commercial laying flocks (GAO, 1999, p. 25), and *Egg Industry* magazine observed that "[r]educed feed and water intake is the most detrimental and universal aspect of disease" in laying hens (Beckman & Grieve, 1999, p. 10).

Background on Forced ("Induced") Molting in the United States

"Induced moulting is a form of starvation" (Holt, 1992:165). The U.S. poultry and egg industries use food deprivation as an economic tool to manipulate egg production in commercial laying hens and in male and female birds used for breeding of both egg-type and meat-type birds (North & Bell, pp. 433-452). Prolonged food withdrawal with light-dark manipulation ("altered photoperiod") is the most common method of forced molting in the United States (Holt, 1992:165). The three main methods of forced molting are (1) elimination or limitation of food and/or water; (2) feeding the birds low nutrient rations deficient in protein, calcium or sodium; (3) and administration of drugs, hormones, and metals including methalibure, chlormadinone, and progesterone, high levels of iodine, dietary aluminum, and zinc (Bell & Kuney, 1992:201). Bell reports that "[o]ver the years, most flock managers have eliminated the removal of water and have increased the number of days of feed removal" (1996, p. 4).

In standard forced molting practice, artificial light-dark manipulation accompanies the removal of food from the birds. For example, a 1-week pre-molt cycle of 16 hours of light/8 hours of dark may be followed by a molt schedule consisting of 8 hours of light/16 hours of darkness (Holt & Porter, 1992). Or a 1-week pre-molt cycle of 24 hours of continuous light is followed by 8 hours of light which is increased on day 20 by .25 hours/week back up to the standard 16-17 hours of continuous light (Kalmbach Feeds). According to food microbiologist James L. Smith of the U.S. Department of Agriculture's Eastern Regional Research Center in Philadelphia, the changing of light patterns to manipulate egg laying increases *Salmonella* colonization of laying hens (*Food Chemical News*, p. 5).

Commercial laying hens are sent to slaughter at 17 to 18 months of age (72-80 weeks), or they are kept for another laying cycle, or two (105+ weeks). 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 three or four. By the 10th to 14th day of total food deprivation, a hen who weighed 3.65 pounds before the molt weighs 2.56-2.73 pounds (Kalmbach Feeds). In *Commercial Chicken Production Manual*, North & Bell state that "A fast [sic] of 4 days will usually cause a flock to cease egg production. Longer fasts [sic] of up to 14 days will usually give superior results, but extreme care must be taken to monitor body weight losses and mortality" (1990, p. 434). A method developed at North Carolina State University includes a week of 24-hour continuous artificial lighting prior to food deprivation for 14 days or longer (North & Bell, 1990, p. 439).

Forced molting is designed to extend the "economically useful life" of laying flocks in order to "reduce the cost of a replacement program," and to regulate market prices (North & Bell, 1990, p. 445; Bell, 1996, p. 3; Smith, 1997, p. 8). The economic benefits include not having to feed the birds during the molt and feeding them cheap, inferior rations before and after the molt (Bell, 1996, pp. 3-4). These savings, based on egg value minus feed cost, explain why the majority of the U.S. egg industry, unburdened as it has been by either legal or ethical considerations, has opted to starve hens to make them molt them rather feed them an altered diet that is capable of producing comparable results (Smith, 2002, pp. 8, 27). Since the 1960s, forced molting ("recycling") has been the dominant method of flock replacement for the U.S. table egg industry. In forced-molting terminology, "replacement flock" refers to the same birds--the dwindling number of survivors--used over and over. According to Bell, at any given time in the United States, approximately 70 million laying hens out of a total of 250 million hens are being force-molted or have been force-molted as many as three times, "with disposal ages ranging from 75 to 140 weeks of age" (Bell, 1999, p. 68).

Forced Molting Impairs Birds' Immune Systems

> Induced moulting is a form of starvation and a body of literature has shown that dietary restriction can alter humoral and cell-mediated immunity. Overall, deficient diets have been found to diminish humoral immune responses in humans, rats, mice, and chickens. A variety of effects of similar diets on cellular immune responses were also observed. (Holt, 1992:165)

In 1992, U.S. Department of Agriculture immunologist Peter S. Holt reported a USDA study in which white leghorn hens and white rock layer flocks were deprived of food for 14 days. He wrote that "[f]ood deprivation as a means of inducing a moult in laying hens had a variety of

effects on the immune system of the birds. The number of circulating lymphocytes were significantly decreased in the moulted group compared with the control birds." Observing that "[c]ell-mediated immunity is a very important component of the immune system and any procedure which modifies its effectiveness could have profound effects on the well-being of the bird, Holt found that the "DTH [delayed type hypersensitivity response] to the skin sensitizer DNFB, an indicator of cellular immune responsiveness, was significantly depressed during the moult procedure" (Holt, 1992:170).

Depressed Immunity Invites SE Colonization of Force-Molted Hens

Forced molting is the infliction of a "trauma" that encourages disease (Holt et al., 1994:1268). According to Holt, "Studies in the authors' laboratory have shown that induced molting significantly depressed the cellular immune response and increased the severity of a concurrent intestinal *Salmonella enteritidis* (SE) infection." Microbiological analysis of early *Salmonella enteritidis* infection in molted and unmolted hens has shown that "induced molting has a profound effect on both intestinal and extraintestinal infection by *S. enteritidis*, and these effects occur within 24 hr postinfection in the intestine and within 48 hr postinfection in the livers and spleens" (Holt et al., 1995:55).

> Withdrawal of feed changes the dynamics of an intestinal infection in hens. In contrast to unmolted hens, in which *S. enteritidis* was somewhat localized primarily in the cecum, the molted hens exhibited intestinal *S. enteritidis* infection distributed more along the intestinal tract. In these fasted [sic] hens, the *S. enteritidis* recovery rate was equivalent for colon, cecum, and feces over the first 72 hr, and at 72 hr even the percent recovery of the challenge organism in the ileum equaled that of the other tissues. (Holt et al., 1995:61)

Forced Molting Promotes Transmission of SE Via Stress, Rodents, and Feces

In addition to encouraging SE colonization of individual hens, forced molting encourages SE organisms to spread to other hens in the confinement environment (Holt et al., 1995:62). SE was transmitted “more rapidly to the unchallenged hens in the adjacent cages of molted hens than in unmolted hens, and these molted hens shed significantly more of the organism than unmolted hens [indicating] that induced molting can have substantial effects on transmission of *S. enteritidis* to uninfected hens, which could affect the overall *S. enteritidis* status of a flock" (Holt, 1995:239). One reason for these “substantial effects” on SE transmission is stress.

> The stress of molting thus appears to result in an increase in intestinal numbers of *S. enteritidis* and the transmission to uninfected hens. . . . Stress has also been shown to cause the reactivation and transmission of infectious laryngotracheitis virus in hens. (Holt, 1995:248)

Another reason is rodents. Studies have shown mice to be significant amplifiers of *S. enteritidis* infection in layer operations.

> Mice can shed large numbers of the organism in their feces (up to 10^5 *S. enteritidis* per fecal pellet), and the infection may persist in the mouse population for long periods, even after the poultry houses have been cleaned and disinfected. Mice carrying even low levels of *S. enteritidis* could conceivably infect hens during molting. Because induced molting has been shown to exacerbate concurrent *S. enteritidis* infection, resulting in the shedding of large numbers of the organisms, molted hens could serve as a second amplifier of *S. enteritidis* infection, spreading the organism to other molting hens (and to mice) within a layer operation. (Holt, 1993:416-417)

Still another reason for the "substantial effects" of forced molting on SE transmission is feces.

> [A]lthough molted hens produce diminished amounts of fecal matter during the period of feed removal compared with fed hens, they still shed large numbers of *S. enteritidis* into the room environment. The combined effect of acutely susceptible hens exposed to the large numbers of *S. enteritidis* released into the room resulted in the increased transmission of the organism. Following further rounds of intestinal amplification, the organism readily cycled down the line of susceptible hens. (Holt, 1995:248)

Contaminated Feather Consumption By Forced-Molted Hens

Feathers are mainly composed of the protein, keratin. Amino acid deficiencies such as low arginine content in the food have been indicated as a cause of abnormal feather pecking in confined birds (Vestergaard et al., 1993:1127). Force-molted hens pluck and consume the feathers of adjacent hens in a desperate effort to reduce their hunger. Feathers contaminated with Salmonellae remain contaminated for long periods. In the forced-molting environment, the spread of *Salmonella enteritidis* through flocks appears to be increased by hens consuming the contaminated feathers of adjacent birds (Holt, 1995:248). The hens must thus endure not only

hunger and body depletion but the stress and pain of being plucked by their equally desperate cagemates. The pain of plucking is explained by Gentle and Hunter:

> Nociceptors [pain receptors] have been identified in the skin of several avian species and the detailed stimulus-response characteristics of these receptors have been determined in the chicken. The follicular wall of the feather is richly supplied with general somatic afferent (sensory) fibres and nerves are present in the papilla, pulp and feather muscles. . . . The feather is firmly held in the follicle. (Gentle & Hunter, 1990:95)

Behavioral Indicators of Suffering in Force-Molted Hens

Comparing a bird's capacity to suffer with that of a mammal, Gentle states that "with regard to the anatomical, physiological and behavioural parameters measured, there are no major differences " (1992:235). 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 aversive stimuli, chickens show a rapid increase in heart rate and blood pressure, and behavioral changes consistent with those found in mammals, including efforts to escape, distress cries, guarding behavior, and passive immobility characteristic of animals subjected to trauma that continues regardless of their attempts to reduce or eliminate it (Gentle, 1992).

Chickens deprived of food show pronounced suffering. Contrary to assertions that hens do not suffer in being force molted, Duncan and Mench maintain that the evidence presented "*does* suggest suffering:"

> [T]he increased aggression suggests severe frustration and the increased non-nutritive pecking, some of which was stereotyped, suggests severe frustration and extreme hunger, and the reduced activity suggests debilitation (*Poultry Science*, 2000:934).

As further evidence of animal suffering, they cite molting results from 353 U.S. flocks during 1997 and 1998, which showed that "mortality typically doubled during the first week of molt, then doubled during the second week."

A force-molting study published in *Applied Animal Behaviour Science* showed similar results. Observing that "the hens were highly motivated to perform feeding behaviour and were prevented from doing so" by the researchers, and that "t]he different types of behaviour pattern

which are typical during frustration are displacement movements, escape behaviour, aggression and stereotypies," Aggrey, et al. wrote that "the hens were hungry and were looking for food," and "kept pecking the empty feeding trough, walls and floor." They noted "an increase in negative social interaction," stating that the "increase in negative social interaction may inflict pain which is very important in the evaluation of the wellbeing of the hens." While noting that the frustration behavior appeared to be less in caged hens than in hens on a wire floor system, the researchers cautioned that cage constraints which suppress normal animal behavior are "by no means better for animals. Cages can only allow pseudo-behaviour and therefore cannot be judged as adequate for hens" (Aggrey, et al., 1990:103).

Chickens' cognitive complexity may increase their ability to suffer in being force molted. Cognitive research shows that "the chicken is not an inferior species to be treated merely as a food source" (Rogers, 1995, p. 213), and that in all relevant respects, "birds have cognitive capacities equivalent to those of mammals, even primates" (p. 217). Forced molting subjects an already overstressed bird, characterized as "having a complex nervous system designed to form a multitude of memories and to make complex decisions," to significantly more stress than she is already being forced to cope with (p. 218).

> Chickens in battery cages are cramped in overcrowded conditions. Apart from restricted movement, they have few or no opportunities for decision-making and control over their own lives. They have no opportunity to search for food and, if they are fed on powdered food, they have no opportunity to decide at which grains to peck. These are just some examples of the impoverishment of their environment. Others include abnormal levels of sensory or social stimulation caused by excessive tactile contact with cage mates and continuous auditory stimulation produced by the vocalizing of huge flocks housed in the same shed. Also, they have no access to dustbathing or nesting material. Chickens experiencing such environmental conditions attempt to find ways to cope with them. Their behavioural repertoire becomes directed towards self or cage mates and takes on abnormal patterns, such as feather pecking and other stereotyped behaviours. These behaviours are used as indicators of stress in caged animals. (Rogers, p. 219)

Starvation and Fasting Are Not the Same.

"Anorexia" means loss of appetite or refusal to eat, not food removal. Force-molted hens do not stop eating because they lose their appetite or don't want to eat, but because their food is taken away from them. A visitor to an egg farm in Pennsylvania wrote regarding the first day of a 7-

day starvation program, "When the lights came on, the cackling and clucking rose to a cacophony, accompanied by the sound of thousands of beaks pecking on metal" (Geist, 1991, p. 3).

Naturally-molting hens do not go for days and weeks without eating, while a hen with a clutch of eggs leaves her nest for ten to twenty minutes each day until her chicks are ready to hatch, to forage for food, drink water, defecate, and exercise. Artificially-incubated eggs must be cooled for 15 to 20 minutes a day to match the time the hen is away from her nest. Mrosovsky and Sherry observe that

> While it is presumably possible in theory that the hen is getting hungrier and hungrier as she sits on the nest, a much more elegant and safer solution to the problem would be to lower the set-point [for body fat] and avoid clashes between incubating and eating. Similarly, in the case of hibernators, the motivation to hibernate would have to be very strong to overcome the temptations of food lying right under the animal's nose. (Mrosovsky & Sherry, 1980:839)

Fasting is self-imposed behavior, not food removal. To fast means to abstain from all or certain foods. Fasting originates within an individual or a species as part of a larger purpose or activity that is meaningful to that individual or species, e.g., hibernation, migration, or hatching chicks. A brooding hen is engaged in normal species behavior that is meaningful for her and has no resemblance to the frightening experience of being arbitrarily deprived of food. Mrosovsky and Sherry summarize that when animals fast in nature, fasting is part of their being "engaged in other important activities that compete with feeding" and that evidence shows fasting to be “physiologically different from starvation" (p. 840).

Whereas a brooding hen and a naturally-molting hen are fully intent upon “other important activities that compete with feeding," the hen being starved in confinement has been stripped, without compensation, of her only pleasure, virtually her only activity in confinement, which is eating. Moreover, and most significantly, animals fasting in nature do not generally suffer from immune system breakdown and disease, whereas force-molted hens do. In force-molted hens, cellular immunity is “significantly depressed during food deprivation," and SE infection and transmission are increased (Holt, 1992:173).

USDA Summary of Disease Causality Associated with Forced Molting

Holt summarized the causality between the withholding of food, immunosuppression, and diseases in hens including, but not confined to, *Salmonella enteritidis*, in a review paper obtained by United Poultry Concerns through a Freedom of Information Act request to the USDA, June 3, 1999 (Marquis, 1999). This undated 13-page paper, "Impact of Induced Molting on Immunity and Salmonella enteritidis Infection in Laying Hens," cites studies showing that deficient diets diminish cell-mediated immunity in mammals and birds, and that a concurrence of systemic and infectious disease conditions likewise occurs in force-molted hens (Holt, n.d.). According to Holt, to cite key points:

- "An altered immune response was also observed in birds subjected to induced molting through feed withdrawal" (p. 3).

- "Total peripheral blood lymphocyte numbers were significantly decreased in molted birds" (p. 3).

- "Elevated levels of serum corticosterone were detected during times of stress [in birds and mammals in other studies]. . . . A similar elevation in this stress hormone was noted in hens subjected to feed removal . . . which may be responsible for observed effects on immunity during an induced molt" (pp. 3-4).

- "Protection [of internal organs from pathogens] is mediated by effector T cells and by a battery of hormone messages called lymphokines which regulate the intensity of the immune response and define what effector cells will play a role in the protection. Breaching this immunity can dramatically alter its ability to protect the host against infection" (p. 4).

- "The discovery [was] that the immune system in molted hens was compromised" (p. 4).

- "The potential problems associated with the presence of *S. enteritidis* in the flock environment therefore become exacerbated when birds are exposed to a stress situation such as feed removal" (p. 5).

- "Stress situations can reactivate a previous infection . . . and feed withdrawal to induce a molt can also cause the recurrence of a previous *S. enteritidis* infection" (p. 5).

- "[R]ecrudencence of infection was observed significantly more often in molted birds. [T]hese birds shed significantly more *S. enteritidis* and more readily transmitted the organism

to previously uninfected, but contact-exposed hens" (p. 5).

- "The molted hens also produced more eggs contaminated with the organism" (p. 5).

- "[I]ntestinal spirochete infections were more severe in molted hens, indicating that, similar to what was observed for *S. enteritidis*, molting upset the equilibrium normally attained between the host and that parasite" (p. 7).

- "Perhaps more telling is the study conducted by the *S. enteritidis* Pilot Project in Pennsylvania (U.S. Department of Agriculture 1995) which showed that the production of eggs contaminated with *S. enteritidis* increased during the molt. These data prompted the authors to categorize molting as a risk factor for *S. enteritidis*" (p. 7).

In their Interpretive Summary of the "The Effects of Induced Molting on the Severity of Acute Intestinal Infection Caused by Salmonella Enteritidis," Holt and his colleagues conclude:

> These results are important to the layer industry since they show that a prevalent industry procedure has a substantial effect on the severity of an SE infection and these effects are observed early in the disease process. Also, many organisms infect poultry and if molting has such rapid effects on an infection by SE, it is very possible that it could have similar effects on infection by other poultry disease agents. (Macri, et al., 1998:1)

Forced Molting Has Been Widely Condemned and Abandoned

The Canadian Veterinary Medical Association and the Scientific Veterinary Committee for the European Union have condemned forced molting.

Food deprivation, the most common method of forcing a molt, was banned in the United Kingdom and then in the European Union as both cruel and unsafe. According to the UK Welfare of Livestock Regulations (1994), "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."

Since studies show that birds "can be molted successfully without ever being taken off feed or being shorted on nutrition for body maintenance," and that the feeding of a wheat middlings molt

diet and the feeding of this diet in combination with corn provide results comparable to food deprivation (*Poultry Times*, 2002), food deprivation should be prohibited. Wheat middlings, which are a by-product of milling wheat for flour, have nutrients. Wheat middlings have higher digestible protein (14-15 percent) than whole wheat (11 percent), less energy (70 therms per 100 lbs) than whole wheat (80 therms per 100 lbs), and about 5 percent fat and 5 percent minerals. While lacking both total protein and high quality protein for poultry use, wheat middlings are not just a non-nutritive filler like cellulose (Duncan. 2002). This diet is therefore less inhumane than starvation.

Conclusion

Forced molting is not therapeutic, prophylactic, or humane. It is not a "rest" but the deliberate infliction of physiologic and cognitive trauma and stress. It is so inimical to the well-being of the birds subjected to it that it overwhelms their immune systems and encourages them to develop and spread diseases such as *Salmonella enteritidis*. Arguments used to justify forced molting merely add insult to injury, as in comparing forced molting to life-saving surgery or to the autonomous act of fasting (Bell, 1996, p. 2).

Forced molting epitomizes the link between the cruelty and contamination that characterizes much of the way we treat farmed animals in the United States. There is not a single federal law in this country that governs how animals are treated on the farm. The moral and legal abandonment of these animals needs to change, and condemnation of forced molting by organizations and associations that profess an animal welfare objective as an integral part of their mission is a logical place to begin. The practices involved in forced molting violate humane standards of animal husbandry as well as the anti-cruelty laws of most states, which require the provision of sustenance for animals. The New Jersey Department of Agriculture should prohibit forced molting and endorse husbandry practices that truly protect the health and well-being of birds.

- **United Poultry Concerns recommends that forced molting by any means be prohibited, but that to ensure minimum welfare standards, if birds are force-molted, they must have water and nutritional food available at all times.**

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III. Keeping of Poultry in Cage Housing and Floor Housing

N.J.A.C. 2:8-4.4 states that the birds' environment shall (a) (e) provide relief from excessive temperature and that (b) constructed shelters should be of sufficient size to provide adequate space for each bird seeking shelter within to stand, lie down, get up, walk, spread her wings, move her head freely, turn around, and rest. (d) states that cage housing shall be of sufficient size to allow each bird to stand upright in the cage without having her head protrude through the top of the cage, lie down, get up, walk, spread her wings, move her head freely, turn around, and rest. (b) includes a provision for the maintenance of air quality by natural or mechanical ventilation.

To implement these regulations, specific measurements must be set for housing space per bird based on the size and weight of the bird. Levels of ammonia and other toxic gases (ppm) must be set for air quality in indoor systems, and an acceptable range of temperatures from hot to cold, and with respect to dryness and humidity, need to be established with a clear definition of "excessive temperature" that takes into account bird physiology and housing density. Provisions need to be added for preventing and responding quickly to power outages since cooling systems used in modern poultry houses frequently fail due to power outages and mechanical problems, killing thousands of birds (20,000 to 125,000) in a single building.

Temperature

> Chickens, being warm blooded (*homeothermic*), have the ability to maintain a rather uniform temperature of their internal organs (homeostasis). However, the mechanism is efficient only when the ambient temperature is within certain limits; birds cannot adjust well to extremes. Therefore, it is very important that chicks be housed and cared for so as to provide an environment that will enable them to maintain their thermal balance. (North & Bell, p. 175)
>
> Chickens cannot withstand concurrent high temperature and high humidity, regardless of their age. (North & Bell, p. 178)
>
> Broilers of the same weight as egg-type birds will produce a greater quantity of heat because broilers grow faster and consume more feed per unit of weight, both of which increase the body heat production. (North & Bell, p. 179)

Effects of Excessive Cold

At 15 degrees F. combs and wattles are susceptible to freezing and frostbite, i.e. painful tissue damage (Wilson, 1974, pp. 222), and excess cold suppresses the birds' immune systems—the thymus system and bursal system (North & Bell, p. 755). Ammonia levels are especially high in indoor compounds during the winter when ventilation is reduced to conserve heat. At such times, the ammonia concentration can go as high as 200 ppm (Carlile, 1984:101). Condensation during the winter wets the litter, releasing ammonia fumes into the air and increasing painful breast blisters and manure burns in floor-housed birds (Weaver, W.D.& Meijerhof, 1991: 746-749).

Effects of Excessive Heat

Chickens and turkeys do not perspire. To cool themselves they dustbathe, reduce activity to generate less heat, and hold their wings out from their bodies to expose more body surface to the air. At an average humidity, when the ambient temperature reaches 85 degrees F, chickens and turkeys pant with their beaks open to bring more outside air in contact with the membranes of the respiratory tract (North & Bell, pp. 177-178). When the temperature reaches 80 degrees F, the birds develop heat stress—physiological responses to remove excess deep body heat.
The main source of heat in the poultry house is the bird's own body heat multiplied many

thousands of times. When the house gets hot the birds cannot properly rid themselves of this heat. Their effort to do so only increases the amount of heat, increasing the heat stress. When birds are heat stressed, they lose immunity because the bursal and thymus cells responsible for the production of most of the antibodies in the young chick are heat sensitive (North & Bell, p. 754-755; Coleman, 1995, p. 17).

Caged birds, in which each bird has 48 square inches to 72-86 square inches of living space, have little or no room to extend their wings to expose more body surface and thus dissipate excess heat. According to North & Bell, "The caged birds are completely surrounded by hot air, and have no way to get away from the heat" (pp. 336-337).

- **United Poultry Concerns recommends that to maintain minimum bird welfare standards temperatures should be set between 20 degrees F and 75 degrees F in indoor housing.**

Excretory Ammonia and Other Toxic Gases

> Ammonia in a poultry house is nauseating to the caretaker, irritates the eyes, and affects the chickens. Ammonia is measured in parts per million (ppm). Normally, 15 ppm will prove uncomfortable for human beings; 50 ppm for 8 hours is considered the maximum allowable concentration. (North & Bell, p. 189).

Other toxic gases regularly found in poultry houses include carbon dioxide, methane, and hydrogen sulfide (North & Bell, p. 188).

Excretory ammonia is a colorless irritant gas produced by microbial activity on the nitrogen excretion content, uric acid, in poultry manure. This activity is not a problem under natural conditions where birds travel about in small groups over wide areas, but in the densely-packed poultry facilities the breakdown of poultry manure releases poisonous ammonia gases into the atmosphere. Poultry workers experience eye, lung, and nasal irritation as well as headaches, nausea, wheezing, coughing and other respiratory problems. Chickens suffer more because they are locked in the houses and because chickens need three times more air volume than humans per kilogram of body weight to meet their oxygen requirements (Carr & Nicholson, 1982, p. 743).

In chickens and turkeys 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 (Muirhead, 1992, p. 11). This mucous mats and ultimately destroys the tracheal cilia that 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 42 days develop pulmonary congestion, swelling, and hemorrhage. Increased ammonia thickens the arterial walls and shrinks the air capillaries in exposed birds (Xin, 1986, p. 2). Ammonia stress in chicks and young chickens harms their developing immune systems causing "severe vaccine reactions" (Carlile, p. 101). "Ammonia in the air is absorbed into the blood of turkeys [and chickens] and causes immunosuppression. It prevents phagocytosis of E. coli organisms in the blood and

suppresses the lysis [destruction] of E. coli organisms within the macrophage cells. . . . Very young poults are very susceptible to the immunosuppressing effects of ammonia" (National Turkey Federation, 1995, pp. 10-11).

- **United Poultry Concerns recommends that to maintain minimum bird welfare standards ammonia in poultry houses must not exceed 15 ppm at bird level.**

Cage Housing

N.J.A.C. 2:8-4.4 (d) states that cage housing shall be of sufficient size to allow each bird to stand upright in the cage without having her head protrude through the top of the cage, lie down, get up, walk, spread her wings, move her head freely, turn around and rest. These standards need to include measurement specifications linking cage dimensions, number of birds per cage, and size and weight of each bird to ensure that each bird can assume these basic postures and perform these basic behaviors. Clarification is needed as to how cages could possibly be modified to allow each bird in a cage holding several birds to perform each of these behaviors individually, let alone together, including the ability to "walk" in compliance with the standards.

- **Minimum welfare standards must incorporate the fact that an adult "egg-type" hen weighing three to four pounds needs the following number of square inches to perform basic functions (*Poultry Digest*, 1990, p. 44; see also Mench, 1992: 114-117).**

To stand: 74 square inches
To turn: 197 square inches
To stretch: 138 square inches
To flap wings: 290 square inches
To ruffle feathers: square 135 inches
To preen: square 178 square inches
To scratch on the ground: 133 square inches

To scratch on the ground (forage), a hen needs a minimum of 133 square inches. Since cages do not allow hens to scratch on the ground thus frustrating a fundamental behavior of these foraging birds, cages cannot be considered humane. Consider the fact that "[i]n natural conditions chickens spend between half and 90% of their time foraging, making up to 15,000 pecks a day" (Turner, 2003, pp. 22-23).

Regarding commercial housing conditions for hens, poultry welfare specialist Dr. Joy Mench explains that when there are eight birds in a cage the size of a drawer – 20 inches wide, 19 inches deep – "the bird barely has room to stand. And even then she's really compressed. There are lots of birds pressing against her and turning around is really difficult. And a really important thing about this as well, probably one of the main reasons that crowded hens experience a lot of illness, is there's not enough space for all the birds to feed at the same time. If you're a low ranking bird – low on the peck order – you tend to get pushed to the back during feeding and you can't get enough food. So quite often the lowest ranking bird in that cage gets sick and dies" (Mench, 2002).

Theoretically, changes in the battery cage to create an "enriched" cage could improve bird health and welfare. According to Mench,

> these include changes in cage shape which result in increased feeding area, redesigning cages to prevent birds from becoming trapped, the installation of solid partitions that can be used by hens to decrease claw length. The cage environment can also be improved by the addition of simple enrichment devices. . . . More extensive modifications of cages designed to increase environmental complexity and provide an opportunity for the performance of a greater variety of behaviors involve providing perches, dustbaths, nesting areas, and/or communal association areas (Mench, 1992: 120-121).

However, the so-called enriched cage, while containing a few token improvements, "provides no significant benefits and it still has insufficient space to enable hens to perform many basic movements, let alone achieve any meaningful exercise" (Pickett, 2003, p. 2). Farm Animal Welfare Network explains that the extra space per bird in the enriched cage is "equivalent to the size of a post card":

> The proposed stocking density for hens in enriched cages (at least 750 cm2 of cage area per hen [about 110 sq. inches] of which 600cm2 [94 sq. inches] must be 'usable,' i.e. having enough headroom and a floor slope not exceeding 14%) is barely more generous than the traditional battery cage. Consider the behavioural needs of hens (walking, running, wing stretching, foraging, dustbathing, limited flying etc.) and instantly the enriched cage is revealed for what it is – little better than the traditional cage, and almost equally cruel (FAWN, 2002).

Summarizing several decades of scientific studies, Compassion in World Farming concludes:

> Laying hens kept in cages are deprived of nearly all their natural behavior. They are unable to forage, to peck and scratch on the wire floor, to dustbathe, or to stretch their

> wings. Caged hens will still go through the motions of having a dustbath, by squatting down, raising their feathers, rubbing themselves on the floor and flicking imaginary dust on their backs. If they are given access to litter material for a dustbath, 'They do it over and over again, apparently making up for lost time when they were unable to do the real thing.' (Turner, pp. 35-36).

Biologist Marian Stamp Dawkins describes some of the basic genetic behaviors of ground-dwelling birds that are frustrated by cages:

> 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 naïve 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. (Dawkins, 1993, p. 153).

Avian specialist Dr. Lesley J. Rogers offers a concise summary of why cages for chickens are not even minimally humane or compatible with animal welfare. Her condemnation encompasses not only the cage but the caged environment as a whole in its relationship to the complex cognitive sensitivities, abilities, and requirements of chickens: "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" (p. 218):

> Chickens in battery cages are cramped in overcrowded conditions. Apart from restricted movement, they have few or no opportunities for decisionmaking and control over their own lives. They have no opportunity to decide at which grains to peck. These are just some examples of the impoverishment of their environment. Others include abnormal levels of sensory or social stimulation caused by excessive tactile contact with cage mates and continuous auditory stimulation produced by the vocalizing of huge flocks housed in the same shed. Also, they have no access to dustbathing or nesting material.
>
> Chickens experiencing such environmental conditions attempt to find ways to cope with them. Their behavioural repertoire becomes directed towards self or cage mates and takes on abnormal patterns, such as feather pecking or other stereotyped behaviours. These behaviours are used as indicators of stress in caged animals. (Rogers, p. 219)

A significant cruelty inherent in the caged-hen environment is the acoustic surroundings of continuous loud noise, and not just any noise but the ongoing noise of pain and suffering expressed in the vocalizations of thousands of birds crammed together. Add to this the endless sound of machinery running. These “abnormal levels of sensory stimulation” and “continuous auditory stimulation produced by the vocalizing of huge flocks housed in the same shed” constitutes cruelty. Research shows that '‘[t]he domestic fowl responds to both sudden and continuous noise by increased adrenal cortical activity and there is little evidence of habituation”(Freeman, 1998: 50).

N.J.A.C. 2:8-1.1 states that “[f]or purposes of these rules, an animal’s status or well-being shall be determined based on a holistic evaluation of the animal (p. 18).

N.J.A.C. 2:8-1.2 defines “animal welfare” as “a state or condition of physical and psychological harmony between the animal and its surroundings characterized by an absence of deprivation, aversive stimulation, over stimulation or any other imposed condition that adversely affects health and productivity of the animal” (p. 20).

These formulations of animal wellbeing and animal welfare condemn the cage system. A holistic evaluation shows that there is no harmony between battery-caged birds and the caged environment. The caged environment is characterized by the presence of deprivation. Caged hens are deprived of an environment compatible with their nature as foraging animals with wings, legs, horny toes, innervated beaks, full-spectrum color vision and other evolved characteristics that distinguish them as groundnesting birds with well-defined, scientifically characterized patterns of behavior and activity. Reducing animals to mere behaving organisms and productive units is not animal welfare. It is not even minimum animal welfare. That a profitable number of birds out of tens of thousands and millions of birds can survive to the young age of a year or two in the pathogenic battery-cage environment does not constitute animal welfare. Many of the birds who do survive to that age are diseased, injured, and moribund. Avian specialist Joy Mench explains the fallacy of using mass productivity of animals as an indicator of individual animal welfare:

> It is now generally agreed that good productivity and health are not necessarily indicators of good welfare. In large part, this is due to the way in which these measures are defined and manipulated within the commercial productive environment. Although stress is known to result in suppression of growth and reproduction as well as in decreased immunocompetence, these effects occur at the level of the individual animals. Productivity, however, is often measured at the level of the unit (e.g. number of eggs or egg mass per hen-housed), and individual animals may be in a comparatively poor state of welfare even though productivity within the unit is high.
>
> Additionally, health and productivity may be maintained or enhanced through genetic and environmental manipulations which do not necessarily improve the welfare of the individual. Broilers, for example, have been selected for a high rate of growth, which may also be associated with physical disability and skeletal weakness. The movement restriction imposed by both these disabilities and by crowding further enhances growth rate, as does the administration of subtherapeutic levels of antibiotics.

> In this case, productive performance has been enhanced at the expense of health and by limiting the behavior and movement patterns of the animal. (Mench, 1992: 108-109).

Examples of the Disharmony Between Chickens and Caged Housing

- Foot and claw injuries are more frequent in cages than in other systems, with lesions, fissures and hyperkeratosis on the feet and with overgrown, twisted or broken claws. (Appleby, p. 7)

- Due to continuous rubbing against wires and each other in addition to other aspects of the caged environment, caged hens abnormally lose 10-15 percent of their feathers by 10 months old, 20-25 percent of their feathers by 13 ½ months old, and 40 percent of their feathers by approximately 18 ½ months old. (Elliot, 1994, p. 27)

- Restriction of movement in cages, combined with the constant demands of egg production, results in bone weakness by the time they come to be slaughtered; for example, the tibia has been shown to be up to 41 percent stronger in floor-housed hens than in caged birds. (Appleby, p. 8; Picket, p. 2)

- Evidence of fear, including tonic immobility (an index of fear) is much longer for hens housed in cages than for those in pens. (Appleby, p. 11)

- Hysteria is associated both with large group size and with barren environments. In battery-environments, although the hens are divided into small wire cages, arranged in rows, up to 8 tiers deep, the overall flock size numbers in the thousands and tens of thousands, and this, with the barrenness, facilitates hysteria. (Appleby, p. 11; Pickett, p. 3)

- Hens become frustrated and physically debilitated because they are prevented from performing their natural behaviors of walking, nesting, dustbathing, and perching. “Without access to a nest site, nesting motivation is frustrated and without a perch, roosting is prevented. Restrictions on movement within a cage cause frustration and prevent normal bone maintenance, particularly in the legs and wings” (Baxter, 1994: 614).

- Caged hens are driven to peck at each other because they are deprived of an environment in which their genetic pecking behavior can be properly expressed. For example, provided with food that can be eaten quickly (mash in a trough in front of the cages), hens who would normally spend up to 50 percent of their time feeding and responding to varied stimuli have nothing left to do with their time or their beak but to pick at each other (Appleby, p. 9). Deprived of dustbathing material, caged hens are driven to “rake in” the feathers of their cagemates (Vestergaard, p. 1132). Deprived of food in being force-molted, hens pick and consume the feathers of cagemates in order to obtain nutrients and to assuage their extreme hunger (Holt, p. 248). By contrast, “[h]armful pecking of other hens . . . is never seen among wild chickens” (Keeling cited in Turner, p. 23) or among feral domestic fowl of either sex (McBride, pp. 135, 158).

- **United Poultry Concerns recommends that to ensure minimum welfare standards for birds used for commercial egg production, all cages should be prohibited and birds should have access to the outdoors. If kept indoors, birds must be provided with**

sufficient space and adequate nesting (no more than 4 hens per nest), perching and dustbathing materials and facilities.

Floor Housing for "Meat-Type" Birds and Parent Flocks

> New practices may be implemented to improve welfare and productivity in intensive poultry systems, but it should be realized that even vastly improved intensive systems are unlikely to meet the cognitive demands of the hitherto underestimated chicken brain . . . 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. (Rogers, 1995, p. 213)

N.J.A.C. 2:8-4.4 (e) states that floor housing shall provide each bird with enough room to stand, lie down, get up, walk, spread his/her wings, more his/her head freely, turn around and rest; and (g) an environment that supports poultry health. "Meat-type" birds must also be given environmental stimulation that encourages them to exercise and that promotes activities other than sitting and eating in the dark or semi-dark and putting on weight. The interplay between genetic and environmental influences must be taken into account in order to implement meaningful welfare standards for these birds. "Genetic influences" include not only the birds' physical characteristics, but their behavioral and cognitive-emotional repertoire, in keeping with the N.J.A.C. 2:8-1.1 (a) standard that "[f]or the purpose of these rules, an animal's status or well-being is determined based on a holistic evaluation of the animal" (p. 18).

Genetic problems of birds raised for meat

"Selective breeding has resulted in painful lameness and heart disease. These birds grow so fast that they are usually slaughtered at 6 weeks old and in fact would be unlikely to survive to adulthood because of problems with their legs, heart and lungs" (Smith, Summary, 2003).

These genetic problems are exacerbated by poor housing conditions including filth and density:

- "As far as density goes, if the house is 400 feet long and 40 feet wide, that is 16,000 square feet of floor space. If the company puts down 24,000 baby chicks in the house, they will have 6 tenths of a square foot of floor space each when they are fully grown" (Clouse, Email, June 19, 2003).

- "Meat chickens are kept in sheds so crowded that their movement and resting are disturbed and the manure-filled litter on the floor causes sores and air pollution" (Smith, Summary, 2003). In the increasingly used "tunnel ventilation" poultry houses, airflow is automated and the houses are frequently constructed so as to exclude all natural sunlight: "The walls are solid and the birds only have the dimmest of light, to allow them to eat and drink, but discourages moving around, because they [the companies] want the birds to grow bigger faster. Birds at 5 weeks can hardly stand because their legs are so weak and with no natural light or exercise their joints are too soft to carry the weight" (Forsberg, 2003).

Two basic types of housing are used for birds raised for meat in the US: a) the confinement

buildings that came into use in the mid-20th century known as "conventional" housing; and b) the confinement buildings that started replacing conventional housing in the latter part of the 20th century known as "tunnel ventilation" housing.

a) Conventional Housing.
Former North Carolina contract poultry grower Mary Clouse explains that conventional poultry houses are "those built as recently as three or four years ago using side curtains made of a plastic/fiber material of various colors that can be raised and lowered on the long sides of the 400-500 ft. buildings. When lowered either by handcrank or automated 'curtain droppers,' the air flows through the houses from side to side, allowing wind, airflow assisted by fans along the sides and down the center, natural light and sunshine to 'air out' the houses. In cold weather, the curtains can be raised to trap the natural body heat of the birds and warm the houses. In the past, translucent curtains allowed a certain amount of light into the houses even when the curtains were pulled up. The curtains could be lowered a foot or two to let the ammonia out and then tightened again" (Clouse, 2003).

b) Tunnel Ventilation Housing (Bucklin; Clouse).

Tunnel ventilation houses, in contrast, are "built with the curtains tightly attached to the house frame so that no air or light enters the house through the sides. Vent boards at the top of the walls can be controlled by air pressure to allow air in near the roof edges. Some tunnel houses are being built with solid walls since there is no need for curtains. Large exhaust fans are located at one end of the house and large openings are built on both sides of the other end where air is drawn into the house, down the center and out the end fans. The outside air pressure forces air into the house through the air inlets. The air can be cooled by placing wet evaporative cooling pads over the inlets so that the air is cooled as it passes through, an advantage during extreme hot weather" (Clouse, 2003).

Welfare Disadvantages of Tunnel Ventilation Housing (Bucklin; Clouse):

- The dimly lighted interior of the houses reduces the movement of the birds around the house to simply getting up to eat and drink, then sitting down again. Essentially the birds are being raised in the dark and farmers say it is difficult for them to see the birds and that sudden light or a flashlight frightens the birds into piling up, causing injuries and suffocation.

- The equipment on which the birds' lives depend is always in danger of failing and frequently does fail. "Farmers are afraid to leave their farms for more than a few minutes. Computer generated alarms connected to a beeper on their belt, beside their bed or in the house alerts them that the temperature is too high or too low in a certain house, water pressure is down indicating a leak somewhere, the fans are off or the power has cut off in one of the houses." If the problem is not quickly identified and fixed, all 25,000 birds in any one house die from suffocation and dehydration. By contrast, farmers with conventional houses can drop the curtains to allow air to circulate in the houses while they run errands so that, even if the power goes off, the birds won't suffocate.

- The solid walled houses and some of the curtained tunnel houses are showing an increase in

dampness and diseases. As a result, some farmers with solid walled houses have had to tear off the wall on one side (south if possible) and replace it with curtains.

- Algae builds up on the evaporative cooling pads so the pads must be periodically replaced.

- With poultry houses a football field and a half long (500 ft to 600 ft long and 40 ft. to 45 ft wide), even the most powerful fans leave "dead spots" in corners, near ceilings, along the walls, and in the middle of the house where the air is not pulled evenly. Because of the high density of the birds, who occupy every square foot of floor space, many birds are in the "dead spots" where there is not ventilation at all. (Clouse, 2003)

Health and Welfare Problems Associated with both Types of Housing

- High stocking density restricts chickens' ability to perform natural behavior including walking, pecking, scratching at the litter, and preening. Under standard commercial conditions chickens weighing 4 ½ to 6 lbs have little more than a half a square foot of living space per bird in the last two weeks of their 42-47 days of life. Specifically, a 5 lb bird has 0.8 square foot (North & Bell, pp. 456-457). Chickens in the US are now being raised to an average weight of 5.06 pounds (U.S. Broiler Industry Structure, NASS, 2002). Fifteen to twenty birds weighing over 5 lbs are confined to 12.5 square feet of living space or less.

- High stocking densities lead to filthier litter resulting in ammonia burned skin, breast blisters, hock burns, and footpad dermatitis. Foot sores and hock burns are related to leg disorders. Birds with leg disorders sit more, and if the litter is wet and dirty with feces, which it is in standard commercial housing, they develop more burns and sores, causing them to walk less, sit more, and become more burned, in a continuous cycle of filth, pain, suffering, lameness, and disease (Turner, et al., 2003, pp. 17-20).

- High stocking densities make temperature control more difficult. A study published in *Animal Welfare* in 2002 found that broiler chickens were most likely to pant in the last two weeks of their lives when stocking densities were highest. Deep panting indicates thermal discomfort and poor welfare (McLean, et al., 2002, cited in Turner, et al., 2003, p. 19).

- High concentrations of ammonia and dust in broiler chicken sheds damage the birds' health and welfare, encouraging the development of ascites, increased respiratory disease, inflammation of the trachea and of the eyes, and decreasing immune resistance to disease.

Genetic Weakness of Birds Bred for Fast Rapid Growth for Meat Production:

- Most of the welfare issues specifically related to commercial broiler chicken production are a direct result of genetic selection for unnaturally fast growth. The modern broiler chicken's body is forced to put all its resources into the two burdens of growth and feed conversion at the expense of achieving balanced growth and body maintenance. (Turner, et al., p. 9).

- Skeletal Disorders, metabolic diseases, high mortality Forced rapid growth of broiler chickens, representing a combination of genetic selection and intensive feeding and

management programs, is the main cause of the skeletal disorders and metabolic diseases leading to high mortality. Broiler chickens have a mortality rate of 1 percent a week, seven times the mortality rate of laying hens of the same age The usual mortality rate for standard-growing broiler chickens is 1 percent per week compared to 0.25 percent per week for slower-growing broiler chickens and 0.14 percent for young laying hens (SCAHAW cited in Turner, et al., pp. 9, 28).

- Leg Disorders Leg disorders are a major cause of poor welfare in broiler chickens. "In fact, there is evidence that, far from improving, leg problems may have further deteriorated during the 1990s" (Turner, et. al., p. 10). This is because the poultry industry, without regard for the suffering and welfare of the birds, continues to increase growth rates: "The rate of broiler growth and final market weights continue to increase" (Bilgili, 2003, p. 49).

- Pain That the lame birds are in pain has been shown in studies reported in the *Veterinary Record*. Lame broiler chickens treated with carprofen, an analgesic, completed an obstacle course in 18 seconds compared to 34 seconds for the lame birds to complete the course (McGeown, et al., 1999 cited in Turner, et al., p. 11). Lame chickens allowed to choose between feed that contained carprofen and regular feed chose to eat more of the feed with carprofen, and the amount of carprofen consumed increased with the severity of the lameness. The authors concluded that "lame broiler chickens are in pain and that this pain causes them distress from which they seek relief" (Danbury, et al., 2000: 310). The walking ability of lame birds who chose to consume the given carprofen-laced feed was "significantly improved in a dose-dependent manner" (Danbury, et al., 2000: 307).

- Heart Failure Fast-growing broiler chickens suffer from two major forms of heart failure: Ascites Syndrome and Sudden Death Syndrome. These cardiovascular diseases are induced by the birds' inability to supply the high levels of oxygen needed to support their abnormal metabolic demands. "All their energy is spent on growth and efficient feed conversion, leaving them short of oxygen for their other bodily needs so that their hearts have to work much harder. The broiler [chicken] selectively bred and managed for very fast growth has a genetically induced mismatch between its energy supplying organs and its energy consuming organs" (Turner, et al., p. 13).

- Ascites syndrome (pulmonary hypertension 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 support normal oxygenation of blood" (Odum, 1993, p. 18; Davis, 1996, pp. 94-96)

- Sudden death syndrome (SDS) is an acute heart failure disease that affects mainly the fast growing male chickens who "suddenly start to flap their wings, lose their balance, sometimes cry out and then fall on their backs or sides and die, usually within a minute" (Turner, et al., pp. 13-14).

- "Both ascites and SDS are examples of heart failure occurring in young birds only a few weeks old. Their hearts and lungs have been unable to keep up with the fast growth of their body muscle. These are largely preventable diseases caused by breeding and managing

broilers for high growth rate and feed conversion, at the expense of their overall health" (Turner, et al., p. 14).

- Lowered Immune Response There is evidence that the selection of broiler chickens for rapid growth and feed conversion lowers the birds' antibody responses to infection (Rauw, W.M., et al., 1998). An experiment on the immune responses of different broiler strains found that 40 percent of the fast-growing, heavier birds died when infected with E. coli bacteria, compared to 8-20 percent mortality for slower growing breeds. The results indicated that "rapid growth rate substantially reduces broiler [chicken] vitality" (Yunis, et al., 2002).

- Reduced Activity Birds bred for fast rapid growth and feed conversion are inactive compared to normal birds of the same age due in part to the effects of lameness and orthopedic pain (Danbury, et al., 2000; Gentle, 1992). 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 (nociceptors), supports the behavioral evidence that the birds are in chronic pain. For example, "Turkeys develop degenerative joint disease, especially hip disorders, which result in reduction in spontaneous activity and sexual activity" (Gentle, 1992: 242).

- In 1990, the American Association of Avian Pathologists identified the three most common bone problems associated with the extremely rapid growth of present day poultry: angular bone deformities; 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 (Schleifer, 1990, pp. 10-14). These painful bone disorders are one cause of the inactivity of birds raised for meat.

- Birds bred for fast rapid growth are less active than normal birds of the same age because breeding for increased breast muscle has shifted their center of gravity forward. This negatively affects how they walk and places added stresses on their hips and legs. At just 6 weeks old, broiler chickens spend 76 percent to 86 percent of their time lying down in the commercial houses (Weeks, et al., 2000). Even so, studies indicate that the sedentary behavior of broiler chickens does not reflect a lack of motivation to move so much as a progressive inability to do so. In a study reported in *Animal Welfare*, for example, four-week-old free-range broiler chickens remained "fairly active, perching and ground scratching being occasionally observed, and walking and running occupying some five to six per cent of their time. But even on a moderate diet, weight gain was still rapid. By week seven the FR [free-range] birds were spending most of the time lying [and] a lying posture was increasingly chosen with age for eating from the feeder in all four groups and for ground pecking (eating grass) in the outdoor groups." Rather than indicating a progressive reduction in motivation to perform normal activities, the researchers surmised that "the musculature became progressively unable to support the [birds'] body-weight for long periods" (Weeks, et al., 1994: 189).

Welfare Problems in Broiler Chicken Breeder Flocks: Genetics, Management and Housing

Broiler breeder flocks embody the complex maladies of fast rapid growth including physical limitations in their ability to mate naturally, malfunctioning ovaries, breathing problems, fertility problems, heart failure, and more. In response, companies raise these chickens in alterations of total and semi-darkness in "blackout housing" and keep them on semi-starvation diets designed to control their weight and restrict their food intake typically by withholding a whole day's food every other day from the time the birds are a month old (North & Bell, pp. 383, 701-702; Harr, 1993, p. 7). When feed is restored, the chickens rush to the feeders, 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. 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, the birds peck at spots on the floor and drink more water to compensate for the sensation of emptiness. This in turn leads managers to restrict the availability of water on "feed and no-feed days" (North & Bell. p, 702). Stressors and stresses to which broiler breeder flocks are routinely subjected can be found in Rosales, 1994.

Additional welfare problems and abuses of broiler breeder flocks:

- The emergence of increased aggression in the male birds towards the female birds. According to Dr. Ian Duncan, "A new problem emerged in the poultry industry in the 1990s. An increasing number of reports described broiler breeder males being very aggressive toward females. . . . Because females are being harassed, badly injured, and even killed by males, this is a welfare problem" (Duncan, *Applied Animal Welfare Science* 4.3).

- Eye disorders Keeping the birds in semi-darkness to limit abnormal aggression makes them more prone to ophthalmic disorders (*How to deal with chicken-rage*, 2000).

- Nasal implants A 2 ½-inch plastic stick called a "nozbonz" may be jammed through the nasal cartilage of cockerels to keep them from putting their heads through the food restriction grill and eating the hens' food. The male birds are frustrated because the females have a much higher allotment of food than the males do to meet the demands of egg production. Males finish their food in about 15-20 minutes and females take several hours (Millman, 2002). While perhaps less than 50 percent of US producers use these nasal implants, they represent a serious welfare abuse (Mauldin, 1999). According to Rogers, 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 sticklike objects that project from the beak outwards, as the nasal implants do, they run with them and other birds follow" and yank at them (Rogers, 1996).

- Millman states that "it definitely takes quite a bit of pressure" to ram the nozbonz through the nasal cartilage, and that a big welfare problem is the birds getting their heads caught in the grills as a result of the nozbonz. Furthermore, "nozbonz are not effective for the purported objective (keeping male heads out of feeders) since the males are extremely food motivated

and soon try their own experiments to access the female feeders. . . .Males will turn their heads to get into the grills and, if attacked by other birds, or frightened, they then often try to pull back, and panic. They may thus injure or even kill themselves. They also sometimes rip the Nozbonz out in the struggle" (Millman).

- **United Poultry Concerns recommends the following minimum welfare standards for birds raised for meat, including parent flocks:**

1. **Forced rapid growth, in which high levels of painful leg disorders and heart failure are common, should be prohibited.**

2. **Chickens should have access to the outdoors or, where they are kept indoors, they need environmental enrichment, such as straw bales and green cabbages, to encourage exercise and sensory stimulation, and to reduce hyperaggressive behavior in male birds used for breeding**

3. **Living space per bird should be doubled so that each young (4 to 6 pound) chicken has at least 1.5 square feet of living space (preferably 2 square feet), and each adult (chicken used for breeding has at least 4 square feet of living space. These birds need adequate space to exercise and to enable them to hold their wings away from their bodies to reduce the heat stress to which heavy chickens are especially vulnerable, made worse by crowding.**

4. **Forcing "meat-type" birds, including parent flocks, to live in darkness and semi-darkness should be prohibited.**

5. **Solid-wall housing should be prohibited. All housing should have side-to-side ventilation and be equipped to allow natural airflow and sunlight. Houses that depend entirely on automated ventilation and watering systems should be prohibited.**

6. **Nasal implants (nozbonz) in broiler breeder males should be prohibited. The feeder grills should be modified to prevent male birds from putting their heads through the food restriction grills.**

7. **Detoeing, dubbing, and debeaking should be prohibited. These mutilations, which are performed without anesthetic, cause pain and stress in birds. Environments should be enriched to enable all birds raised for meat to exercise and to have occupations, space, and sensory stimulation to enable them to perform basic natural behaviors including scratching and pecking at grains, straw bales and green cabbages, and dustbathing.**

8. **Sturdy platforms 10 inches – 20 inches high should be provided for perching or roosting alternatives to sitting on the floor all the time. Unless they become too heavy or it becomes to painful to spring, "broiler-breeders show normal perching behaviour" (Weeks, et al., 1994: 191), and some broiler chickens will perch/roost if a platform is available. Such platforms can help to reduce the crowding and heat build-up on the floor.**

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IV. Beak-Trimming

> Beak shape and anatomy are related to habitat exploitation, food gathering, reproduction, defense, communication, grooming and heat loss via panting. . . . The horny covering of the beak, the rhamphotheca, is derived from a thickened layer of the skin called the stratum corneum. A thin dermis, or underlying layer, is composed of a dense mixture of blood vessels, connective tissues and nerves, which rests on a band of strong connective tissue that lies between the epidermis and the beak bones (Clipsham, 1995, pp. 44-45).
>
> Feather pecking . . . is never seen in the wild and is the result of intensive farming practice. To prevent feather pecking, many hens in cages, and some free-range hens, have their beaks trimmed, causing lasting pain. (Smith, 2003).

N.J.A.C. 2.8-4.7 (e) states that nothing in these rules shall prohibit beak-trimming or other routine husbandry practices provided that they are performed in a sanitary manner by a knowledgeable individual and in such a way as to minimize pain. The term "knowledgeable individual" is not defined and is therefore meaningless until it is so defined. Similarly, the provisions that partial beak amputation should be performed "in a sanitary manner" and "in such a way as to minimize pain" offer no practical guidance as to how these objectives might be accomplished. For example, there is no mention of an anesthetic to deaden the acute and chronic pain of this traumatic operation. Here, as in the case of food and water deprivation of newborn and adult birds, the rules propose to set aside even minimum humane standards in order to accommodate industry practices and conditions that compromise the wellbeing of these, by nature, foraging birds. The government advisory Farm Animal Welfare Council in Britain said in its 1991 Report on the *Welfare of Laying Hens in Colony Systems* that beak trimming is "a serious welfare insult [injury or trauma] to the hens and can result in chronic pain for long periods after the operation," and that beak trimming "should not be necessary in a well-managed system where the hens' requirements are fully met" (FAWC, pp. 23-24).

Chickens, turkeys and other groundnesting birds (galliforms) peck, scratch, and explore the ground throughout much of the day. The beak functions as a hand, mouth, and investigative organ. Avian physiologist and ethologist Dr. Lesley Rogers explains in *The Development of Brain and Behaviour in the Chickens* (1995), that "birds must use the beak to explore the environment, much as we use our hands," and that "[f]rom the time of hatching the young chick pecks at small visual stimuli, preferring three-dimensional, spherical objects" (pp. 95-96). In the newly hatched chick, "[b]oth mandibles are richly endowed with innervation for taste and proprioception, and furthermore the end of the beak contains a number of cutaneous nociceptors, which transmit the sensation of pain. When the beak is trimmed . . . these receptors are removed" (Rogers, pp. 97-98).

So integral is pecking to chickens that "even if they are provided with plenty of food, freely available in front of them, the birds will often spend a great deal of time pecking and scratching at the ground while foraging, even though they could eat without doing this" (Nicol & Dawkins, 1990, p. 47). Chickens watched by researchers "spent up to 60 percent of their active time pecking the ground" (p. 47). In research in which chicks were fed slurry to prevent them from pecking, the researchers found that "chicks peck independently of whether or not they need to peck in order to eat" (Kienholz, 1990, cited in Davis, 1996, p. 66).

The onset of destructive feather pecking and other abnormal beak-related behaviors in chickens, often inappropriately generalized as "cannibalism," is described in *American Poultry History 1823-1973*. For example, "[w]hen chickens are too crowded they are likely to develop the habit of feather picking, and this can easily lead to cannibalism and ensuing mortality" (Wilson, 1974, p. 233). In the 1920s, the use of wire platforms "led to a completely new problem—cannibalism" (Coleman, 1976, p. 51). 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" (Day, 1976, p. 142). North & Bell state that "[w]hen birds are given limited space, as in cages, there is a tendency for many to become cannibalistic" (1990, p. 309). Other causes of "cannibalism" in chickens include

deprivation of dustbathing material, which can lead chickens to be "more likely to come to accept feathers as dust," and fear (Vestergaard, et al., 1993, p. 1138). Beak trimming doesn't 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" (Riddell, 1991, p. 827).

Poultry Welfare Specialists Oppose Debeaking ("Beak Trimming")

The following five statements explain why beak trimming cannot be considered a "humane" practice or an alternative to humane housing conditions that enable foraging birds to perform their natural behaviors.

- "There is no physiological basis for the assertion that the operation is similar to the clipping of human finger nails. 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 horn, bone and sensitive tissue causing severe pain." (Brambell, 1965)

- "Close examination of filmed feeding activity showed that beak trimmed birds were not able to grasp feed pellets as efficiently as intact birds. The result 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, occurs as a result of trimming." (Cunningham, 1992, p. 131)

- "The main injury caused by humans, knowingly rather than accidentally, is beak trimming. It is now known to cause pain, in the short term and probably also in the long term, in the way similar to other amputations." (Appleby, 1991, pp. 9-10)

- "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 [tumors] 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." (Duncan, 1993, p. 5)

- "The re-shaped beak appears to be inappropriate for food and manibulation and food intake is reduced. Also, the re-shaped beak may be less able to provide tactile, proprioceptive and even taste rewards. These considerations raise both ethical and practical concerns about the practice of beak trimming. Feed efficiency is reduced by beak trimming because the birds either fail to grasp the food pellets or do not transfer them to the pharynx for subsequent swallowing, but the stereotyped pattern of pecking is not altered by beak trimming. It is as if the operation causes something akin to the phantom limb effect which occurs in humans following the loss of a limb." (Rogers, 1995, p. 98)

Conclusion

Feather-pecking and "cannibalism" occur in environments that do not meet the innate behavioral needs of foraging birds. When such birds are kept in crowded barren buildings and cages with nothing to do, no foraging and dustbathing material, and no means of escape, such as perches, aberrant pecking behavior and injuries occur. In cages, for example, "feather pecking occurs particularly during the afternoon when hens have finished feeding and laying eggs, and have little else to do." To correct this problem, "poultry farmers should provide pecking materials not only because hens need to peck but because the consequences of deprivation may be fatal" (Nicol & Dawkins, p. 50). Moreover, "it is not only how much litter is provided that is important, but the type and quality of the litter" (Harrison, p. 43).

> [T]he type of litter and depth of litter, as well as quantity of litter, have a vital part to play in reducing feather pecking and encouraging adequate scratching and dustbathing behaviour, and even in keeping the birds warm in winter. Wood shavings are the most commonly used litter in alternative systems today, but they are also the least satisfactory because they may adhere to the outer feathers and do not penetrate to the skin to assist in removal of excess oil and ensure that the plumage remains in good condition. Recommended alternatives are peat, chopped straw and sand. (Harrison, p. 43).

N.J.A.C. 2:8-1.1 states: "For purposes of these rules, an animal's status or well-being shall be determined based on a holistic evaluation of the animal" (p. 18). A holistic evaluation of the beak and the welfare implications of partial beak amputation to accommodate standard agricultural practices must therefore incorporate the following facts:

> Exploratory and foraging behaviour is very important to chickens. The chicken's beak is used like a sensitive hand for exploration and manipulation as well as feeding. Chickens search for food by scratching with their claws and pecking, turning over leaves to look for seeds, insects or grubs. According to scientists, "pecking is a precise, high-tech activity" requiring good coordination with the eye. In natural conditions chickens spend between half and 90% of their time foraging, making up to 15,000 pecks a day (Turner, pp. 22-23).

- **United Poultry Concerns recommends that to ensure minimum welfare standards for poultry, debeaking/beak trimming should be prohibited and living conditions should be enriched to enable the birds to express their natural beak-related behaviors of foraging,**

dustbathing, and preening within the amount of space each bird needs to perform these natural behaviors without physically impinging upon any other bird.

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V. Detoeing of Male Broiler Breeder Chicks and Turkey Poults

N.J.A.C. 2:8-4.7 (f) states that toe trimming may be performed on male broiler breeder chicks and poults up to one day of age for chickens and up to seven days of age for turkeys.

According to Duncan (2001: 215), though little investigation into the welfare costs of toe trimming has been done, "Gentle and Hunter (1988) produced neuronal evidence suggesting that detoeing may be painful at the time of amputation but is less likely than beak trimming to be followed by chronic pain. There also are reports that toe clipping turkeys depresses growth rate and increases mortality (Newberry, 1992; Owings, Balloun, Marion, & Thomson, 1972), which is highly suggestive of decreased welfare." Since detoeing removes the toes right up to the skin and the skin of birds' feet are innervated, this has to be a painful and traumatic operation (Gentle, 1992), made worse by all the other painful and traumatic operations inflicted on the birds.

> Poults . . . are squeezed, thrown down a slide onto a treadmill, someone picks them up and pulls the snood off their heads, clips three toes off each food, debeaks them, puts them on another conveyer belt that delivers them to another carousel where they get a power injection, usually of an antibiotic, that whacks them in the back of their necks. Essentially, they have been through major surgery. They have been traumatized. (Donaldson, et al., p. 27, cited in Davis, 2001, p. 138).

Dr. Ian Duncan provides a summary of the welfare abuse of detoeing birds used for breeding within the larger context of the birds' frustrated, painful, and impoverished live:

Male breeder chickens are detoed, beak-trimmed and their combs are dubbed (cut off). Turkeys used for breeding are detoed and beak-trimmed, and the male turkeys' snoods are cut off (desnooded). All these "elective surgeries" involve pain, perhaps chronic pain. No anesthetic is ever give to the birds. These mutilations are crude solutions to the problems created by modern methods of raising chickens and turkeys. For example, broiler breeder males have been bred, consciously or unconsciously, for hyperaggressiveness. They injure and cause fear in the hens, who cannot escape from these roosters in the breeder houses. Worse, to keep their weight down, meat-type breeder chickens are given only 40-50 percent of the amount of food they would normally eat. They are chronically hungry. Their abnormal behavior, such as compulsive pecking, shows they are obviously suffering. (Duncan, Farmed Animal Well-Being Conference,

June 28-29, 2001; see *PoultryPress*, Fall 2001, p. 2, online at http://www.upc-online.org.)

- **United Poultry Concerns recommends that detoeing be prohibited. Detoeing is a painful mutilation that is performed without anesthetic. It is a welfare-abuse response to raising birds in crowded, frustrating, and impoverished environments. Instead of mutilating the birds, the environment should be upgraded.**

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VI. Catching, Carrying and Removal of Birds

N.J.A.C. 2:8-4.7 (a) – (d) states that birds shall be caught, carried and removed in a manner that minimizes injury to the birds; all doors and openings through which birds are moved shall be large enough to provide passage of birds without injury to the bird; catching and transport protocols shall minimize the number of times a bird is handled between capture and re-housing or slaughter; and the time between capture and slaughter shall be minimized to the extent possible consistent with food safety considerations.

Two types of chicken catching are used: a) catching by hand and b) catching by machine. Hand

(manual) catching is the standard method, but the use of mechanical catchers ("harvesters") is increasing in the United States. According to an article in *WATT PoultryUSA*, hand catching chickens is "difficult, repetitive and tedious" (O'Keefe, 2002, p. 24).

> Stooping over to catch and pick up chickens a thousand or more times in a shift is physically demanding, and this task is a prime candidate for automation. Carrying the birds to the coops is also a strenuous task. Mechanical broiler harvesting systems are designed to make these two jobs less physically demanding. The challenge for the automation systems is that they must be gentle enough to pick up live birds and transfer them to coops with minimal injury and still be tough enough to handle a variety of house conditions. (O'Keefe, p. 24).

Hand catching involves a standard crew of seven to eight workers catching 7,000 birds an hour. Mechanical catching machines catch 5,000 to 6,000 five-pound birds per hour (Shane, 2002, p. 44). A former chicken catcher (1979-1984), later a chicken slaughterhouse employee in the "live hang" area of a Tyson slaughter plant (1997-2002) in Arkansas described his experience with both methods (Butler, June14-15, 2003):

a) Manual Catching

> "I caught chickens from 1979-1984. When I did this we picked up as many as 5 in one hand and 4 in the other. It was not uncommon to 'lose' more than a thousand or more a night. The 'lost' birds would die of a heart attack, be squashed by a forklift or by people stepping on them, or just people getting mad and killing them because the chickens pecked them, scratched them, or pooped on them. The main problem was the speed of the work because we were not paid by the hour, but by the number of chickens caught. Here is how it went on a night of catching:
>
> "The forklift takes the main cage off the truck and puts it in the chicken house. There is a guy standing there that sets a plastic block on the ground, which the cage sits on, so that it is tilted back. This is done so that the birds slide to the back of the cage and cannot escape back out. The positioning of the block is extremely important because it signals where to put down the cage. The block is reflective and the environment dark. If the block is badly positioned, then chickens get squashed by the cage. I also saw a forklift driver run over a guy and break both of his legs because of this. The block was set in too close to the chickens and the guy squatted down trying to catch the chickens. The pay was figured per thousand birds per crew and averaged out to about 10 cents per catcher per bird. So, the idea was to catch as quickly as possible and go home, since we made the same amount of money for 6 hours work hurrying as we would have made in 8 by taking our time."
>
> b) Machine Catching
>
> "As for the automated catchers, I can tell you that some work needs to be done to improve the usage of these. The guy that ran the one for our plant was not trained at all to use it, other than showing him how to turn it on and off as well as how to put it over the chickens. I have personally never seen him operate it, but I have seen the difference in the conditions of the birds when they were caught manually versus catching them by

machine by someone not trained.

"The birds that had been caught by the machine were beat up, bruised up, had broken bones, and were generally broken apart. Just about every injury that could happen did happen. It was much worse than when they were caught by hand. They were also covered with dust and lime from the chicken house floor. This dust and lime also covered the belt and the [live] hangers. Several hangers got poisoned by the lime, one coming down with chemical pneumonia with burns in his respiratory tract from it. There were also more birds that died of heart failure after the introduction of the machines than before. The dust level in the hanging cage grew immensely to unsafe levels.

"The amount of dust and lime is increased on the birds that are caught by the machine because it is sucked up along with the birds. Kind of like a giant vacuum machine, just going along sucking up or sweeping up birds and the stuff off the floor. I have never actually seen one operate to know exactly what they do, just the effects. It seems to also clean up the floor for the chicken farmer as well as catching chickens. There would be hundreds of pounds of dust, dirt, chicken litter, lime, etc. during the night after these machines started being used. It took one man just standing at the end of the belt shoveling it off and out to keep it from building up around the gears of the belt and burning up the bearings. We [in the live hang area of the slaughter plant] would all be covered in the stuff, from it blowing around, just brown from it.

"We were told to turn off some of the fans to keep it from blowing as much, which also made it hotter in there and very hard to breathe. This was when I and the other hangers started getting sick all the time. We all suffered nosebleeds, headaches, coughing, choking, chest pain, and, when the lime was heavy, chemical burns especially around the eyes, nose, lips, armpits, and anywhere else there was moisture from sweat or whatever. It would stick to you in these places." (Butler, June 14-15, 2003).

Welfare Abuses Involved in Catching Birds by Hand and by Machine

Of all the things we do to our animals on the farm, the things we do to them in the 24 hr before they are slaughtered reduce their welfare the most. The surveys that have been carried out during catching and transportation have shown this is just as true for poultry species as for other farm livestock. Birds often are injured during catching and crating, frightened by novel stimuli, stressed by disruptions in their social and physical environment throughout the catching and transportation process, and subjected to climactic extremes during transportation (Duncan, 2001: 216).

- Catching causes birds to suffer from stress, fear, and injury due to panic among the birds and by rough handling (Duncan, 2001: 216).

- "Many types of muscle, bone, ligament, and tendon trauma can occur during catching, handling, vaccination, and loading. In a study conducted to examine the effects of catching methods, researchers found that lifting birds up by one leg resulted in about three times more fractured bones than catching by two legs" (Rosales, 1994: 205).

- "Hip dislocation occurs as the birds are carried in the broiler sheds and loaded into the transport crates. Normally the birds are held by one leg as a bunch of birds in each hand. If one or more birds start flapping they twist at the hip, the femur detaches, and a subcutaneous haemorrhage is produced which kills the bird. . . . Dead birds that have a dislocated hip often have blood in the mouth, which has been coughed up from the respiratory tract. Sometimes this damage is caused by too much haste on the part of the catchers" (Gregory 1998 cited in Turner, et al., 2003, p. 21).

- Carrying these heavy birds, virtually all of whom suffer from some degree of degenerative joint disease, is painful. "[R]ecent work has shown in the joint capsule of bird there are similar [pain] receptor types to those found in mammals" (Gentle, 1992: 235).

- A 1990 study of broiler chickens who were dead on arrival at the slaughterhouse found that 4.5 percent of the birds had dislocated hips (Gregory & Wilkins, 1990, cited in Turner, et al. p. 21).

- A 1992 study found that in a third of cases the femur had actually been forced into the abdominal cavity. The birds can be pushed down roughly into the crates or drawers, resulting in crushed skulls or in wing damage (Gregory & Austin, 1992, cited in Turner, et al., p., 21).

- The percentage of broiler chickens who arrive dead at the slaughterhouse (DOAs) is between 0.1 percent and 0.6 percent (Ekstrand, 1997) or 26 million of 4.4 million birds slaughtered annually in the European Union (Turner, et al., p. 22). This suggests that more than 52 million chickens arrive dead at the slaughterhouse in the United States each year out of a total of 8.5 billion federally-inspected chickens (NASS 2003, P. VIII-37).

- Research in the UK, published in 1992, found that 51 percent of "dead on arrivals" 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" (Gregory & Austin, 1992, cited in Turner, et al., p. 22).

- Other traumatic injuries caused by catching, loading, and unloading include hemorrhage from fractured femurs, ruptured livers and crushed heads, and dislocated necks (Turner, et al., p. 22).

- Mechanical harvester operators can be too aggressive and can overload the machine (O'Keefe, p. 28).

- DOAs are worse with mechanical catching for 8-pound birds ("roasters") than for 4-pound to 5.5-pound birds, because the drawers are not always deep enough for the larger birds and "the opening is only one inch bigger than the bird" (O'Keefe, pp. 28-29).

- (Some?) mechanical harvesters pick up hundreds of pounds of litter along with the birds, who are thus encased in the litter, ammonia, feces, dust, dander, etc. (Butler, June 14-15, 2003).

Conclusion

The catching of conscious birds by hand and by machine inflicts enormous suffering on the birds. However, there are practices that may reduce the suffering of the birds, according to those who have caught chickens manually and also worked in the chicken slaughterhouses and seen the effects of catching birds both by hand and by machine. Based on this information,

- **United Poultry Concerns recommends that:**

1. **Birds should be caught and held by both legs to reduce injuries and pain.**

2. **The constant pressure for more speed should be drastically reduced because the demand for speed is a primary cause of much of the abuse and suffering of birds that occurs during catching and loading. Workers should be given time to catch chickens as humanely as possible or, better yet, trained to use a well-designed automated catching machine, with a well-trained operator, to do this work.**

3. **Catching crews should be paid by the hour instead of by the number of birds caught, and be trained to use the catching machine correctly to reduce injuries, terror, and pain in the birds. An untrained individual should not be permitted to operate a catching machine. Catchers, crew leaders, and machine operators should receive sensitivity training and be rewarded for behavior that results in fewer manifestations of rough handling and suffering of the birds.**

4. **All doors of cages, crates, drawers, etc. should be wide enough to avoid injuring the birds, and the compartments in which the birds are to be transported should be deep and wide enough to reduce the suffering and injuries of birds in transport and in being placed in and removed from the compartments. Specific door and compartment measurements to fit birds of the standard weights (e.g. 4-pound birds to 8-pound birds) should be established and required of all poultry companies.**

5. **Catching machines should be constructed and operate so as not to pick up floor litter along with the birds. Machines must be well-designed in all respects and they must be operated ONLY by properly trained people.**

6. **Stepping on and kicking chickens can be prevented if a person is employed to walk along, clapping his hands, and shuffling his feet to raise the dust, thereby chasing the chickens to one side of the house. This leaves an open area for the catchers to walk around without harming the chickens.**

7. **Corral gates should not be used and chickens should not be swung up to loaders on a truck to be put into cages. This is unnecessary and hurtful to the chickens.**

8. **Workers who vent their rage on birds by stomping on them, running over them with forklifts, and other acts of personal brutality should be fired and excluded from future**

industry employment.

9. **The whole catching, transportation, and preslaughter system should be integrated with an automated catching machine placing birds in crates, modules of crates being placed on environmentally controlled trucks, and the crates moving straight into a humane gas-stunning unit at the processing plant. (Duncan 2001: 216)**

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VII. Conclusion

"Many of the conditions in which poultry live and the procedures to which they are subjected compromise their welfare." – Dr. Ian J.H. Duncan, 2001, Animal Welfare Issues in the Poultry Industry: Is There a Lesson to Be Learned? *Journal of Applied Animal Welfare Science* 4.2: 207-221.

"We are setting the scene for a very long time to come and the more we permit poor conditions to become entrenched the more difficult it will be to get even minor changes the next time around." – Ruth Harrison, *The Animal Welfare Institute Quarterly*, Spring 1992, 41.2: 14.

N.J.S.A. 4:16-1 et seq. is cited on page 4 of the proposed rules and regulations to say that "[t]hese standards are not intended to modify those routine animal agriculture practices that are performed each day by farmers in New Jersey, but rather to protect animals from only those practices that are inhumane or cruel. Only treatment of livestock that is cruel or inhumane is subject to enforcement action."

However, as the preceding discussion has shown, many routine agricultural practices involving chickens and other birds have been determined by veterinary and/or agricultural expertise as well as by commonsense to be cruel and inhumane. For the proposed standards to have meaning, these practices must be prioritized, identified, regulated, and in some cases, prohibited, and/or replaced. Otherwise, the standards are a false exercise designed to protect institutionalized animal abuse and animal abusers. The rules cannot exclude routine animal agricultural practices from regulation and at the same time claim to protect animals. Practices that are deemed cruel and inhumane under the proposed rules and regulations are not even identified. Presumably, the distinction amounts to something like this: men entering a turkey barn and beating turkeys to death with metal pipes for kicks constitutes animal abuse, but men entering a turkey barn and beating turkeys to death with metal pipes to cull the flock does not constitute animal abuse because beating birds with metal pipes is a routine agricultural method of killing unwanted birds.

In fact, it is precisely this and many other types of "routine animal agriculture practice" that need to be brought within the regulatory framework of the laws of New Jersey because these practices affect the largest number of defenseless animals. For example:

- It has become routine agricultural practice to crowd birds into barren, ammoniated caged environments that frustrate and distort their natural patterns of behavior such as dustbathing. Depriving birds of an environment in which to perform bodily hygiene is cruel and inhumane and should be prohibited.

- It has become routine agricultural practice to subject hens to artificially long days mimicking the longest two or three days of midsummer for a year, and then, when their bodies are depleted by this relentless exposure, to starve them for two full weeks. Both the artificially

long days and the food deprivation are cruel and inhumane and should be prohibited.

- It has become routine agricultural practice to "adapt" birds to cruel and inhumane environments by cruelly and inhumanely cutting and burning off parts of their bodies without anesthetic: beaks, combs, and toes nails are cut and burned to the quick. These painful amputations and mutilations are cruel and inhumane and should be prohibited.

- It has become routine agricultural practice to force birds to grow so fast and so large that their skeletal systems cannot support their body weight and their heart and lungs cannot supply the oxygenated blood required by their overworked bodies. Inducing growth characteristics in birds that result in heart attacks, lameness, and orthopedic pain is cruel and inhumane and should be prohibited.

- It has become routine agricultural practice to force birds to live in dark "tunnel houses" and "blackout houses" so they will just sit in the dark, eat, and grow into "meat" and lay eggs. Forcing birds to spend their lives in the dark or semi-dark is cruel and inhumane and should be prohibited.

The majority of birds raised for food live in barren unwholesome milieus devoid of comfort, enlivening sensory stimulation, exercise, or any accommodation of their natural interests, feelings, and behaviors. It is because these milieus are so overwhelmingly cruel and inhumane that it becomes necessary for poultry and egg producers to try to get lawmakers to agree to exempt them from ethical accountability and legal oversight. As noted by agricultural animal expert Dr. Temple Grandin, in reference specifically to egg industry practices, "It's a case of bad becoming normal" ("Analyst Says Poultry Growers Oblivious to Poor Conditions," *Western Producer*, Dec. 12, 2002). Fortunately, animal scientists such as Dr. Grandin have made, and are continuing to make, and to build, the case against the bad that has become normal, and a growing number of animal scientists are speaking out, as follows:

- "A 'broiler' chicken is essentially an overgrown baby bird, easily hurt, sometimes treated like bowling balls" - Dr. Bruce Webster, American Meat Institute Stunning Conference, Feb. 21-22, 2002.

- "Slaughter is different from processing in that the raw material is alive, has a central nervous system, can express emotional states, and has biological components like humans." – Dr. Janice Swanson, American Meat Institute Stunning Conference, Feb. 21-22, 2002.

- "When I visited a large egg layer operation and saw old hens that had reached the end of their productive life, I WAS HORRIFIED. Egg layers bred for maximum egg production . . . were nervous wrecks that had beaten off half their feathers by constant flapping against the cage." – Dr. Temple Grandin, National Institute of Animal Agriculture, April 4, 2001.

- "You are not handling a lump of plastic. You are handling animals with central nervous systems that feel pain and suffering." – Dr. Janice Swanson to the United Egg Producers, quoted in *Feedstuffs*, January 1, 2001.

- "Forced molting programs usually involve withholding feed for 10 to 14 days and simultaneously reducing day length. Forced molting shortens the period of nonproduction to about 8 weeks but results in a huge increase in stress and suffering. A rather crude indicator of reduced welfare is increased mortality. During forced molting, mortality increases dramatically. . . . Apart from mortality, however, the evidence suggests that hens suffer enormously during forced molting. Hunger is an extremely powerful motivation, and chickens have evolved to forage and consume food throughout the day. Consequently, deprivation of food acts as a drastic stressor. Food deprivation results in a classical physiological stress response. Frustration of feeding leads to signs of extreme distress such as increased aggression and the formation of stereotyped pacing. Extremely hungry birds also show stereotypic pecking at objects such as feeders." - Dr. Ian J.H. Duncan. 2001. Welfare Issues in the Poultry Industry: Is There a Lesson to Be Learned? *Journal of Applied Animal Welfare Science* 4.3: 207-221.

- "Without access to a nest site, nesting motivation is frustrated and without a perch, roosting is prevented. Restrictions on movement within a cage cause frustration and prevent normal bone maintenance, particularly in the legs and wings. Confinement in a battery cage is concluded to cause suffering to laying hens in several different ways" - Dr. M.R. Baxter. 1994. The welfare problems of laying hens in battery cages. *The Veterinary Record* 134: 614-619.

- "[H]ens kept in battery cages, even for 1 laying year, have very fragile skeletons. There is such a high demand for eggshell calcium in modern laying hens that cortical as well as medullary bone is used as a source of calcium, which results, at the end of 1 laying year, in easily broken bones. The bone weakness is exacerbated by lack of exercise in cages. [In addition,] traditional battery cages are poorly designed for the removal of hens. Small doors to the cages result in hens getting limbs caught as they are being removed." – Dr. Ian J.H. Duncan. 2001. Welfare Issues in the Poultry Industry: Is There a Lesson to Be Learned? *Journal of Applied Animal Welfare Science* 4.3: 207-221.

- "The avian beak is a complex sensory organ. . . . Beak amputation results in extensive neuromas [tumors] being formed in the healed stump of the beak which give rise to abnormal spontaneous neural activity in the trigeminal [threefold] nerve. The nociceptors [pain receptors] present in the beak of the chicken have similar properties to those found in mammalian skin and the neural activity arising from the trigeminal neuromas is similar to that reported in the rat, mouse, cat and the baboon. Therefore, in terms of the peripheral neural activity, partial beak amputation is likely to be a painful procedure leading not only to phantom and stump pain, but also to other characteristics of the hyperpathic syndrome, such as allodynia and hyperalgesia [the stress resulting from, and extreme sensitiveness to, painful stimuli." – Dr. Michael Gentle, et al. 1990. Behavioural evidence for persistent pain following partial beak amputation in chickens, *Applied Animal Behaviour Science* 27: 149-157.

- "Spontaneous degenerative joint disease is widespread in certain strains of intensively reared poultry, and . . . recent work has shown in the joint capsule of birds there are similar receptor types to those found in mammals and it seems likely that joint degeneration in birds may be

accompanied by painful sensations." – Dr. Michael Gentle. 1992. Pain In Birds, *Animal Welfare* 1: 235-247.

- "[F]indings support the suggestion . . . that lame broiler chickens are in pain and that this pain causes them distress from which they seek relief." – Dr. T.C. Danbury, et al. 2000. Self-Selection of the analgesic drug carprofen by lame broiler chickens, *Veterinary Record* 146: 307-311.

- "[I]t should be realized that even vastly improved intensive systems are unlikely to meet the cognitive demands of the hitherto underestimated chicken." – Dr. Lesley J. Rogers, *The Development of Brain and Behaviour in the Chicken***,** 1995, p. 213.

- "In no way can these living conditions [battery cages] meet the demands of a complex nervous system designed to form a multitude of memories and to make complex decisions." – Dr. Lesley J. Rogers, *The Development of Brain and Behaviour in the Chicken*, 1995, p. 218.

- "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*, 1995, p. 213.

United Poultry Concerns urges the New Jersey Department of Agriculture to take these scientific observations seriously and to incorporate these and other findings presented in this document into the new rules and regulations in keeping with the proposal stated on page 2 under Summary that "[p]romoting the health and well-being of New Jersey's livestock is a concern to all compassionate individuals who want to ensure farm animals are humanely treated."

Thank you very much for your attention.

Sincerely,

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United Poultry Concerns addresses the treatment of domestic fowl in food production, science, education, entertainment, and human companionship situations and promotes the compassionate and respectful treatment of domestic fowl.