

# The “New Perception” of animal agriculture: Legless cows, featherless chickens, and a need for genuine analysis<sup>1</sup>

D. Fraser<sup>2</sup>

Animal Welfare Program, University of British Columbia, Vancouver V6T 1Z4, Canada

**ABSTRACT:** A growing popular literature has created a “New Perception” of animal agriculture by depicting commercial animal production as 1) detrimental to animal welfare, 2) controlled by corporate interests, 3) motivated by profit rather than by traditional animal care values, 4) causing increased world hunger, 5) producing unhealthy food, and 6) harming the environment. Agricultural organizations have often responded with public relations material promoting a very positive image of animal agriculture and denying all six of the critics’ claims. The public, faced with these two highly simplistic and contradictory images, needs knowledgeable research and analysis to serve as a basis for public

policy and individual choice. Scientists and ethicists could provide such analysis. In some cases, however, scientists and ethicists have themselves produced misleading, polarized, or simplistic accounts of animal agriculture. The problems in such accounts include the repetition of unreliable information from advocacy sources, use of unwarranted generalizations, simplistic analysis of complex issues, and glossing over the ethical problems. The New Perception debate raises important and complex ethical issues; in order to provide useful guidance, both scientists and ethicists must consider these issues as research problems that are worthy of genuine investigation and analysis.

Key Words: Animal Production, Animal Welfare, Environment, Ethics, Food Supply, Sustainability

©2001 American Society of Animal Science. All rights reserved.

J. Anim. Sci. 2001. 79:634–641

## Introduction

When it was published in 1964, Ruth Harrison’s book *Animal Machines* opened an intense debate about the ethics of modern animal agriculture. The book focused principally on the welfare of animals kept under intensive production systems, such as battery cages for hens and single crates for veal calves, and it also raised questions about the safety of eating products from animals raised under such unnatural conditions. The book triggered enormous public concern, and the welfare of farm animals has remained a highly contentious issue ever since. In subsequent years, other writers raised additional concerns about animal agriculture, including its effects on world hunger and the environment (Lappé,

1971) and the tendency toward corporate-level control of commercial animal production (Singer, 1975). Thus by 2000, the year of Mrs. Harrison’s death, the debate that she did so much to stimulate had expanded to include a much broader set of issues.

“Debate,” however, is perhaps too mild a term. The treatment and use of animals has long been a subject of passionate disagreement in Western culture (Preece, 1999), dating back at least to ancient Greece (Sorabji, 1993) and involving deeply rooted cultural values (Fraser, 2001). Perhaps as a result, modern disagreement about the ethics of animal agriculture has often taken the form of highly simplistic and emotionally charged pronouncements, either condemning animal agriculture as thoroughly bad or defending it staunchly. These simplistic portrayals misrepresent the complex realities of animal agriculture, but they do raise genuinely important issues.

In this article, I describe the polarized positions taken by the critics and defenders of animal agriculture, and the themes that emerge in their claims and counterclaims; I then comment on the role played by scientists and ethicists in this debate; finally, I argue that research and analysis by scientists and ethicists are badly needed to move the discussion beyond simplistic and misleading portrayals and to arrive at a genuine understanding of the issues.

<sup>1</sup>This article is dedicated to the memory of Ruth Harrison, whose death in 2000 deprived animal agriculture of a sincere, compassionate, and informed critic. I am grateful to Dan Weary and Janice Swanson, to the reviewers, and to many other colleagues for helpful comments and discussion, as well as to the Natural Sciences and Engineering Research Council of Canada for financial support of this research.

<sup>2</sup>Correspondence: Faculty of Agricultural Sciences and Centre for Applied Ethics, MacMillan Bldg., 2357 Main Mall (phone: 604/822-2040; fax: 604/822-4400; E-mail: fraserd@interchange.ubc.ca).

Received December 29, 1999.  
October 6, 2000.

## Contrasting Images of Animal Agriculture

At an agricultural fair in 1992, a woman stopped outside the dairy exhibition and explained to a nearby farmer that she did not want to go in and see the legless cows. She understood, she said, that modern cows had been bred without legs, and were kept on conveyor belts that moved them from one side of the barn, where they were fed, to the other side, where they were milked. The farmer, somewhat mystified, coaxed the woman inside, where she was relieved to see that cows still looked roughly like cows (*Farm and Country*, 1992).

Had the farmer been spending his time in a library rather than a milking parlor, he might not have been caught off guard. When Jim Mason and Peter Singer published their book *Animal Factories*, they quoted animal geneticist R. S. Gowe as saying, "at the Animal Research Institute [in Ottawa] we are trying to breed animals without legs and chickens without feathers" (Mason and Singer, 1980, p. 35). The Animal Research Institute was not, of course, trying to breed such monsters, and Dr. Gowe denies making the statement, although he allowed that it might have been a "heavily doctored" version of an ill-advised jest about the power of genetic selection (R. S. Gowe, personal correspondence, 1992).

Any humor was evidently lost on popular author John Robbins (1987, p. 64), who invented a story around the quotation in his *Diet for a New America*: "You may have thought, as I did, that God pretty much knew what He was doing when He designed animals. But the folks at the Animal Research Institute . . . have a better idea. The director of the Institute, R. S. Gowe, enlightened me on the subject. . . . Said Gowe, proudly, 'at the Animal Research Institute we are trying to breed animals without legs, and chickens without feathers.'"

The inventing of stories continued in *67 Ways to Save the Animals*, whose author (Sequoia, 1990, p. 45) described animal production as a world ". . . where animals have become the immobilized machine parts of great automated assembly lines in darkened factories—tools whose sole purpose is to convert various feedstuffs, including some quite toxic substances, into flesh for human eating . . .," adding that this is "exactly how more than five billion animals are raised for food in this country today."

In sharp contrast to legless cows on assembly lines is a view of animal agriculture promoted by many supporters of the animal industries. For example, the "Kid's World" Web page of the North Carolina Department of Agriculture and Consumer Services (NCDACS, 2000) refers viewers to its "Barnyard Palace" site, featuring photographs of cows in a green, spacious field, a calf in a grassy outdoor enclosure, and a sow nursing her litter unrestrained in a straw-bedded pen. In the same vein, the "ForKids" Web site of the National Pork Producers Council (2000) offers a "Farmtastic Voyage," in which the children of a third-generation farming family, pictured holding piglets, assure visitors that "the main job of

a pork producer is to make sure the pigs are healthy, comfortable, and well fed." And children's books such as *The Amazing Milk Book* (Ross and Wallace, 1991) and *Cows in the Parlor* (McFarland, 1990) are replete with images of animals grazing in green pastures and relaxing under shady trees.

Of course, these various images, both positive and negative, do not result from efforts to describe animal agriculture objectively. Instead the images were selected or constructed for rhetorical purposes, to create either approval or disapproval. When we look beyond these superficial images and examine the various substantive claims that have been made about animal agriculture by its opponents and defenders, we see a similar process whereby facts and arguments have been marshaled to put animal agriculture in either a negative or positive light.

## The New Perception

The view of animal agriculture promoted by its critics and opponents involves six interrelated claims (Table 1), which, for simplicity, I will call the New Perception of animal agriculture.

First, in the New Perception, animal agriculture is portrayed as highly detrimental to animal welfare. Criticisms range from the view that intensive housing robs animals of "all pleasure in life" (Harrison, 1964, p. 3) to claims that farm animals "suffer from birth to death" (Sequoia, 1990, p. 45), are "literally driven mad" (Robbins, 1987, p. 88), and "experience the same mental anguish that would drive many humans to suicide" (Penman, 1996, p. 25). Modern systems of animal production are often described in stark terms using urban-industrial imagery: farms are said to have become "factory farms," where animals take on the role either of machinery or of oppressed workers. Moreover, unusual or aberrant practices are sometimes described as common or typical. Regarding pig production, for example, Newkirk (1990, p. 87) states that "70 to 90%" of market pigs are kept tethered by the neck; Achor (1996, p. 83) claims that "sows are often strapped to the floor" for parturition and nursing; and Robbins (1987, p. 93) states that "often" swine are "simply given raw poultry or pig manure" to eat.

Second, the New Perception portrays animal agriculture as mainly controlled by large corporations rather than by individuals or families. Some writers simply state that large corporations have taken over substantial sectors of animal agriculture (Marcus, 1998) or that "factory farming" is "threatening the family farm with extinction" (Dolan, 1986, p. 67). Other critics acknowledge the continuing role of individual producers but portray them as "victims" overwhelmed by agribusinesses (Mason and Singer, 1980, p. 97) and forced by economic necessity to "follow the lead of the multinational agricultural conglomerates" (Robbins, 1987, p. 97).

A third theme is that animal producers are motivated purely by profit, not by any compassion for animals or

**Table 1.** Six features of animal agriculture as depicted by the New Perception and by neotraditional portrayals

New Perception	Neotraditional portrayals
1 Detrimental to animal welfare	Beneficial for animal welfare
2 Mainly controlled by large corporations	Mainly controlled by families and individuals
3 Motivated by profit	Motivated by traditional animal care values that lead to profit
4 Causing increased world hunger	Augmenting world food supplies
5 Producing unhealthy food	Producing safe, nutritious food
6 Harmful to the environment	Not harmful, and often beneficial, to the environment

traditional ethic of animal care. For example, Coats (1989, p. 21) states, “now humane treatment is seen as unnecessary, irrelevant, and in conflict with the maximization of profit.” And M. W. Fox (1997, p. 24) characterizes some contemporary animal production as “doing business without regard for moral or ethical concerns such as animal suffering.” In support of this view, some critics portray animal producers as callous individuals “who long ago came to accept bashing an animal’s brains out . . . as all in a day’s work” (Robbins, 1987, p. 91).

Fourth, New Perception writing often portrays animal agriculture as causing increased world hunger by using grain and land to produce animal products for the wealthy instead of providing basic necessities for the hungry. Common claims are that grain fed to livestock in the West could be shipped to hungry people in other nations (Coats, 1989) and that hungry countries export food to wealthy nations for livestock feed instead of retaining it for their own citizens (Rifkin, 1992). Commonly cited statistics are that an acre of land can produce 165 pounds of beef or 20,000 pounds of potatoes (Robbins, 1987; L. Fraser et al., 1990; Newkirk, 1990) and that, if Americans reduced their meat consumption by 10%, there would be enough grain to feed 60 million people who starve to death each year (L. Fraser et al., 1990; Newkirk, 1990).

Fifth, the New Perception portrays animal agriculture as producing unhealthy food. Gold (1983, p. 85) states that “overconsumption of animal products contributes strongly to . . . obesity, heart attacks and cancer of the bowel.” Other critics link animal products to a wide range of diseases including “migraine, arthritis, infant colic, diabetes, and cataracts” (Fox, 1997, p. 122). Concerns are also expressed over residues of “drugs, hormones, and antibiotics” in meat (Dolan, 1986, p. 80); pathogenic bacteria in animal products (Sequoia, 1990); and inadequate or corrupt inspection by government agencies (Mason and Singer, 1980).

Finally, the New Perception portrays animal agriculture as harmful to the environment. Common themes are that livestock cause water pollution and global warming (Rifkin, 1992); that tropical countries are destroying natural rainforest to produce livestock for export (Singer, 1990); that overgrazing and feed grain production cause soil degradation (Lappé, 1982); and that livestock production accounts for most loss of topsoil in the United States (Robbins, 1987; Sequoia, 1990). According to one critic, cattle “are destroying the very biosphere itself,

threatening the future stability and viability of entire bioregions of the world” (Rifkin, 1992, p. 191).

Although the six claims constituting the New Perception are in part empirical claims about the nature of modern animal agriculture, they also contain a strong moral component. Traditionally, animal agriculture gained moral legitimacy because it was perceived to have certain positive attributes and was associated with certain positive images. These include images (with deep Biblical roots) of people caring for animals (Preece and Fraser, 2000), of wholesome agrarian living (Thompson, 1998), of stewardship of the land, and of the self-reliance and independence traditionally associated with small farm owners. Animal agriculture was also perceived as a useful activity that produced food from grassland and other resources that would not otherwise be used for human nutrition. The portrait of animal agriculture created in the New Perception seeks to replace these positive images with largely negative ones: big business; industrialization; destruction of nature; waste of resources; victimization of animals, farm families, and consumers; and greed—both for profit (among producers) and for the pleasures of the palate (among consumers)—exercised at the expense of others.

### Neotraditional Portrayals

In response to the New Perception, agricultural organizations have often created promotional materials, typically disseminated in advertisements, brochures, video recordings, and Web pages, portraying animal agriculture as conforming to traditional positive images and to long-established values of animal care and environmental stewardship, while also taking advantage of modern knowledge and technology. These “neotraditional” portrayals put animal agriculture in a thoroughly positive light and contradict each of the six elements of the New Perception (Table 1).

Neotraditional portrayals depict modern farming as thoroughly beneficial for animal welfare. Domestic cattle are said to “live in the lap of luxury” (NCBA, 1998a). Confinement housing, instead of causing animals to suffer, is said to be designed “to protect the health and welfare of the animals” (AIF, 1988, p. 9) and to aid “in providing proper nutrition, clean water and regular care” (Herscovici, 1996, p. 20). Controversial practices are stoutly defended. For example, farrowing crates are described as “protective restraint” for sows, used partly “to

make her delivery easier"; and practices such as branding, dehorning, and castration are said to be done "to ensure the welfare of the animal" (AIF, 1988, p. 10 and 13).

Neotraditional portrayals also deny that animal agriculture is now controlled by corporations. Instead, the vast majority of farms are said to be owned and operated by families and individuals in the United States (AIF, 1988) and Canada (Herscovici, 1996); moreover, it is claimed that corporations could not persuade farmers "to use a system or product that would harm an animal" (AIF, 1988, p. 7).

There is a similar denial that the pursuit of profit has replaced traditional animal care values. Instead, producers "have always recognized their moral obligation to provide humane care for their animals" (NPPC, 1998) and are "committed to providing the utmost in humane care" (NCBA, 1998a). Adherence to traditional animal care values is said to be in the producers' best interest because the livelihood of producers "depends on how well animals prosper" (Foundation for Animal Care Saskatchewan, undated).

Defenders of animal production also portray farm animals as augmenting, not diminishing, world food supplies. Grazing animals are said to be raised mainly on pasture that is "unsuitable for crop production" (Foundation for Animal Care Saskatchewan, undated), and other livestock are said to consume by-products or low-quality grain that is "not usually intended for human consumption" (AIF, 1988, p. 17). Livestock production is said to "help support the production of grains and act like a food bank" and to help "stabilize world food supplies and prices" (Herscovici, 1996, p. 10).

Defenders also portray animal agriculture as producing safe, nutritious food. Chemical residues in agricultural products are claimed to pose no health danger (Herscovici, 1996), and hormone implants in American beef cattle are said to have "no physiological significance for humans whatsoever" (NCBA, 1998b). Industry materials also emphasize the low levels of dietary fat in well-trimmed meat and state that "health claims of a vegetarian diet have not been scientifically proven" (NCBA, 1998c).

Finally, neotraditional portrayals depict animal agriculture as not harmful, and often beneficial, to the environment. It is claimed, for example, that "grazing improves vegetation health and diversity" and that there is "little or no relationship between U.S. beef consumption and destruction of tropical rainforests" (NCBA, 1998b). It is said that animal agriculture makes only a trivial contribution to global climate change, and that "livestock complete the nutrient cycle, returning valuable manure to the soil" (Herscovici, 1996, p. 13).

In addition to defending animal agriculture in these ways, some industry materials also try to discredit the critics of animal agriculture by claiming that they deliberately and cynically misrepresent the facts. For example, Kopperud (1993, p. 24) refers to the use of "propaganda, pseudoscience and outright scare tactics . . . to

frighten Americans away from meat, milk and eggs," and Herscovici (1996, p. 24) states that animal rights advocates "often generate support for their organizations with campaigns based on misconceptions, selective examples, or mistruths."

As noted by Johnson (1991), the contrasting images of animal agriculture constructed by its opponents and defenders have, in effect, created a propaganda battle involving two emotive, oversimplified, and totally contradictory portrayals. These contrasting images and the associated moral claims have left many citizens concerned about the ethical standing of animal agriculture yet profoundly confused about the basic facts of what modern animal production entails. When there is such basic disagreement about the facts, there is little hope of achieving consensus on what would constitute appropriate actions or policy changes, and because the contrasting portrayals describe animal agriculture in such simplistic, black-and-white terms, they appear to offer few options for action other than total abolition of animal agriculture or acceptance of the status quo.

### The Role Played by Scientists and Ethicists in the Debate

Many of the books, articles, and other materials that advance the New Perception clearly constitute advocacy literature. Many are written in an emotive style by vegetarian or animal rights advocates and are obviously designed to promote these causes. Similarly, many of the materials that advance neotraditional portrayals originate from individuals or organizations aligned with agriculture and are obviously designed to promote animal products and to defuse New Perception criticisms.

In addition to these acknowledged advocacy sources, scientists and ethicists have made influential contributions to the New Perception debate. Some of these have involved research and analysis on how animal production methods affect animal welfare (Fox, 1984; Fraser and Broom, 1990; Rollin, 1995), the environment (e.g., Durning and Brough, 1991; Mearns 1997a,b), resource use (e.g., Pimentel and Pimentel, 1996), and world food supply (CAST, 1999). In other cases, however, scientists and ethicists have produced books, articles, and lectures that contain serious short-comings of empirical reporting or ethical analysis (examples below) and that have tended to entrench, rather than rectify, the misleading presentation of the issues seen in the advocacy literature. Because these materials originate from academically trained authors and are often presented in a style that suggests expert knowledge or academic investigation, they have arguably been more trusted and influential than material originating from what are obviously advocacy sources. Some of these works have greatly influenced the advocacy literature, being cited repeatedly as sources of information about animal agriculture. The following examples have been chosen to illustrate some key short-comings of this body of work but not to condemn the particular authors cited, most of whom were

simply conforming to norms that have become common in the New Perception debate.

One common problem is that some ethicists and scientists, instead of providing research and analysis that could help to correct errors made by advocacy writers, have themselves relied on advocacy sources for information about animal agriculture. For example, Singer (1990) drew some of his empirical material from advocacy literature such as *Diet for a New America* (Robbins, 1987), *A Vegetarian Sourcebook* (Akers, 1983), and *Animal Machines* (Harrison, 1964). In describing the environmental impact of meat production, philosopher M. A. Fox (1999, p. 85) referred readers to Robbins's *Diet for a New America*, noting that the "findings are substantiated by many other authors", and citing philosopher J. L. Hill (1996) as an example. However, Hill (1996) had also relied heavily on advocacy literature for his information on how animal agriculture affects human health and the environment, citing three advocacy sources, namely *Diet for a New America* (Robbins, 1987), *Beyond Beef* (Rifkin, 1992), and *The New Vegetarians* (Amato and Partridge, 1989), in over 90 of the book's footnotes. The result is that incorrect or highly selective reporting by advocacy writers can gain an aura of authenticity by being repeated in works by scientists and academics. An example is provided by M. W. Fox (1997), a writer with impressive scientific credentials, who wrote that "meat contains approximately fourteen times more pesticides than plants" (p. 63). In his footnote, Fox identified the source of the information as the vegetarian book *Diet for a New America* (Robbins, 1987, p. 343), which in turn cited the source as the popular health book *How to Survive in America the Poisoned* (Regenstein, 1986, p. 273), and which in turn identified the source as an undated document entitled "Vegetarianism" originating from the "Hinsdale Sanitarium and Hospital Health Education Department." In fact, the idea may well have come originally from the popular book *Diet for a Small Planet* (Lappé, 1971), which reported data showing that levels of DDT and related compounds were about 14 times higher in meat samples than in plant samples in the eastern United States during the 1960s before DDT was banned. If that was indeed the original source, then the information needs to be updated and reevaluated by scientists instead of being repeated (nearly 30 yr later) and extrapolated to pesticides in general.

A second weakness has been a tendency by some ethicists and scientists to treat animal agriculture as an aggregate and draw conclusions that are unwarranted because they are unduly general. Unlike some manufactured goods that are produced in relatively standard ways, animal products are produced in a wide range of ways that differ greatly in their effects. For example, the environmental impact of producing red meat will differ widely between large, intensive, grain-fed systems and extensive grazing systems on unirrigated pasture. However, instead of distinguishing environmentally positive and negative practices, some works (e.g., Gruzalski, 1983; Singer, 1990; Brower and Leon, 1999) consider

meat (or red meat) as an aggregate and then make general conclusions about its environmental impact. Similarly, the welfare of farm animals is affected by many factors (producer attitudes, standard of health, quality of housing) that may vary widely from farm to farm. However, instead of describing and assessing this diversity, some scientists and ethicists deal in broad generalizations such as the following: "The fact is that the meat available from butchers and supermarkets comes from animals who were not treated with any real consideration at all while being reared" (Singer, 1990, p. 160). "Farm animals . . . typically live in desperately cramped and dangerously unclean living conditions, are not properly fed or exercised, are shot up with hormones and other chemicals that render animals seriously ill through much of their lives . . ." (Hill, 1996, p. 40). "Food production in the United States, and in many other countries, has become a system that has no respect for life—only for profits" (Fox, 1997, p. 15).

A third problem has been a tendency for some writers, especially scientists defending animal production, to deny or gloss over ethical issues raised by agricultural practices. An example is provided by North and Bell (1990) in their textbook account of induced moulting in egg production. In describing the practice, North and Bell (1990) note that although 4 d without food is often sufficient to end the current laying cycle so that a new cycle can begin, "longer fasts of up to 14 days will usually give superior results." They caution, however, that in such cases "extreme care must be taken to monitor body weight losses and mortality" (p. 434), weight loss in such cases commonly being 20 to 30% (North, 1984). The authors also note that water is sometimes withheld for 1 or 2 d, although this involves "certain risks" (p. 434) in hot weather—specifically (as described by North, 1984, p. 342) that "panting will be excessive, and there may be dehydration and high mortality." To withhold food and/or water from birds to the point of causing these effects raises obvious ethical problems (Rollin, 1995) and is viewed as unacceptable in at least one country (Ministry of Agriculture, Fisheries and Food, 1988). However, in their section entitled "Animal welfare," rather than outlining and discussing the ethical dimensions of the problem, North and Bell (1990) gloss over them, simply claiming that forced moulting "results in a rejuvenated flock that will live a longer productive life" (p. 878) and that criticisms of such practices involve "misinterpretation" and "unfounded claims."

A final problem has been to propose simplistic analyses of highly complex issues. The problem can be illustrated by two examples from the early 1980s which have presumably influenced a generation of students and other readers.

Philosopher Bart Gruzalski (1983, reprinted in Regan and Singer, 1989), in an essay claiming that "one ought not to raise, slaughter, or eat animals" (p. 252–253), used data from Lappé (1971) to make the following argument: "Many of the peoples of the world are suffering and dying from protein deficiencies. In the United States during

1968, we fed to livestock . . . 20 million tons of plant protein that could have been consumed by humans. Although the livestock provided 2 million tons of protein, the 18 million tons of protein 'wasted' by this process would have removed 90% of the yearly world protein deficit" (Gruzalski, 1983, p. 255).

The simplicity of Gruzalski's argument is superficially appealing, but a genuine analysis of the role of animal agriculture in the global food supply requires that we confront a number of underlying issues. One is whether undernutrition in the world does, in fact, result from a "world protein deficit" that could be eliminated by increasing available supplies. A competing idea, held by many analysts both now and at the time Gruzalski was writing, is that undernutrition is due more to poverty and an inability of disadvantaged people to buy food, rather than an inadequate world supply (e.g., Sen, 1982). A second issue is whether ending the production of animals would, in fact, lead to more grain being produced for human consumption. An alternative hypothesis is that the practice of feeding grain to livestock developed largely in response to a significant overproduction of grain and that eliminating this market would destabilize grain prices and ultimately force many grain farmers out of production. A third issue is whether the political and logistical hurdles could be overcome so that a surplus (or larger surplus) of grain in the United States would actually be distributed to those in need. An even more fundamental issue is whether it is actually desirable to solve problems of hunger in the less-developed nations by on-going food aid, which might run the risk of undermining local agricultural efforts to improve food security. The role of meat production in the global food supply is a complex issue that richly deserves analysis, whereas the simplistic analysis by Gruzalski (1983) is potentially misleading.

A second example is provided by various scientific sources in the 1980s who maintained that the pursuit of profit is sufficient to ensure a high degree of animal welfare. For instance, Rosenwald (1981, p. 578) proposed that ". . . it is in the best interests of the producer to treat his animals as well as possible to get the greatest economic return and, therefore, there really isn't any basic conflict between the ethics and the economics of poultry production." Similarly, the Council for Agricultural Science and Technology (CAST, 1981, p. 1), though acknowledging "some degree of conflict or trade-off" between farm profit and animal welfare, maintained that "the goal of maximum profitability pursued by animal producers . . . leads automatically to improved welfare of both animals and humans. In the competitive free-enterprise system, maximum profitability cannot be achieved without careful attention to the welfare of animals."

In reality, there are good reasons to suspect that the relationship between farm profit and animal welfare would, if properly analyzed, prove to be complex. Under very poor husbandry conditions, market forces arguably should lead to improved animal welfare, because ani-

mals that are diseased, poorly fed, or ill housed can be expected to have impaired well-being and yield poor economic returns. However, pursuit of maximum profit may also involve 1) intense genetic selection for production traits such as very high milk yield, 2) the use of nontherapeutic pharmaceuticals such as bovine growth hormone, or 3) intensive management practices such as zero grazing. All of these presumably enhance profitability, yet they seem unlikely to improve, and may in some cases worsen, the well-being of the animals. Moreover, some animal production practices, such as the use of low-iron, low-roughage diets to produce pale veal, are designed to produce high-value products, not to ensure the welfare of the animals. Furthermore, profits depend on input costs as well as revenues, and some animal welfare concerns are precisely about curbing inputs for the purpose of protecting profit. Examples include raising pigs without bedding, failing to provide anaesthesia for painful procedures such as dehorning, and restriction of movement caused by minimizing space allowances. In fact, calculations show that maximum profit or maximum return on inputs is sometimes achieved at stocking densities that involve severe restriction of movement and reductions in individual productivity (Kornegay and Notter, 1984; Adams and Craig, 1985). The relationship between farm profit and animal welfare deserves to be studied so that we can identify economic obstacles and propose economic incentives that could help solve animal welfare problems. In the CAST document, however, we again see a simplistic analysis that is potentially misleading. (In an updated report, CAST (1997) acknowledged that a review by Craig and Swanson (1994) "suggests that . . . space allowances adequate for individual animal well-being seem greater than those maximizing net profit. . . .")

From these several examples, it appears that a disregard for conventional standards of scholarly research, analysis, and even factual reporting has become a somewhat common feature of academic contributions to the New Perception debate. In fact, in this debate the distinction between advocacy and scholarly writing sometimes seems more a matter of format and vocabulary than of analytical rigor and empirical accuracy.

### **Toward a Genuine Understanding of Animal Agriculture**

Despite the simplistic manner in which it has been conducted, the New Perception debate has raised important and legitimate questions about contemporary animal agriculture. During the last 50 yr, the industrialized nations have seen revolutionary changes and restructuring of animal agriculture, with profound effects on animal welfare, on the ownership of agricultural resources, on the lives of animal producers, and on food availability, human diet, and the environment; and many less-developed nations are also embarking on a similar intensification of animal production (Hursey, 1997). Such complex and far-reaching changes almost

inevitably entail a complicated mixture of positive and negative outcomes for different groups. There is an obvious need to identify the strengths and weaknesses of different options and to develop public consensus and social policy to guide future developments (Thompson, 1998, 1999). As an essential step in this process, the issues raised in the New Perception debate require careful investigation and analysis. Animal scientists, agricultural economists, and allied researchers could play a leading role in this work by evaluating, for example, how different methods of agricultural production affect human and animal welfare, food availability, and the environment. For animal scientists to take on this role, however, will require some reorientation of their work and professional norms (Schillo, 1998; Thompson, 1999). Traditionally, animal scientists tended to see their research as serving the sizeable fraction of the public who were engaged in animal agriculture (Thompson, 1998). More recently, given the steady decline in the number of animal producers, animal scientists often find themselves serving (and funded by) an industry increasingly dominated by specific interests and companies (Cheeke, 1999; Hodges, 2000). In order to contribute constructively to the New Perception debate, animal scientists need to establish a stronger sense of serving the general public by identifying how animal agriculture can best promote the public good, even when this involves questioning beliefs that are common among, and promoted by, the animal production sector. Thus, it may require a degree of cultural change within the animal science profession, and among research managers and funding agencies, in order for the issues raised by the New Perception debate to be accepted as valid and vital topics for agricultural research.

Moreover, to contribute to the New Perception debate, research will need to depart from conventional animal science research in at least two respects. First, any satisfactory analysis of these issues will require a combination of empirical and ethical elements. As noted by Blatz (1991), ethical reasoning by itself will not suffice because the issues demand complex technical inputs; indeed, some ethicists who have raised these issues may inadvertently have brought them into disrepute among scientists by treating the empirical aspects superficially (Fraser, 1999). However, empirical research by itself will not suffice because the issues raised by the New Perception are fundamentally ethical in nature, and the empirical investigation needs to flow from, and be focused on, the ethical issues. A promising model was provided by Rollin (1995), who gave a thoughtful analysis of the ethical issues concerning farm animal welfare and then proposed types of empirical research that could help lead to their resolution. Similarly, J. F. Hurnik (an animal scientist) and Hugh Lehman (an ethicist) reviewed the ethical concerns that arise over the welfare of laying hens, and on that basis used empirical knowledge to identify strengths and weaknesses of different production methods (Hurnik and Lehman, 1988).

Second, for research to contribute to the New Perception debate, both scientists and ethicists must direct research at levels of analysis appropriate to the issues. To date, many ethicists have tended to focus on very broad questions such as whether animal agriculture should cease in totality, whereas scientists have tended to deal with very narrow questions such as whether a particular pharmaceutical product results in faster growth among pigs. However, the level of analysis required to clarify the issues raised by the New Perception often falls between these two extremes. A good model was provided by Mearns (1997a,b), who, in responding to the claim that animal production is necessarily harmful to the environment, outlined various ways in which animal agriculture can also promote environmental values and then showed how the environmental impacts of different animal production systems could be assessed. Similarly, Pimentel and Pimentel (1996) studied the energy, water, and other input costs of different forms of agriculture and provided guidance on the changes needed to preserve future capacity to produce food.

## Implications

As it has unfolded to date, the New Perception debate has been disappointing intellectually, ethically, and politically: intellectually, because the debate has not resulted in a genuine understanding of how animal agriculture affects animals, the environment, and the good of the public; ethically, because the polemical nature of many of the accounts of animal agriculture has tended to polarize the debate and to prevent real ethical analysis of important issues; and politically, because this polarized debate has failed to create a climate of dialogue and consensus building. As a first step toward rectifying these problems, there is an urgent need for scientists and ethicists to avoid simply aligning themselves with advocacy positions and instead to provide knowledgeable research and analysis of the issues.

## Literature Cited

- Achor, A. B. 1996. *Animal Rights: A Beginner's Guide*. WriteWare Inc., Yellow Springs, OH.
- Adams, A. W., and J. V. Craig. 1985. Effect of crowding and cage shape on productivity and profitability of caged layers: A survey. *Poult. Sci.* 64:238–242.
- AIF. 1988. *Animal Agriculture: Myths and Facts*. Animal Industry Foundation, Arlington, VA.
- Akers, K. 1983. *A Vegetarian Sourcebook*. Putnam, New York.
- Amato, P., and S. A. Partridge. 1989. *The New Vegetarians: Promoting Health and Protecting Life*. Plenum, New York.
- Blatz, C. V. 1991. Why (most) humans are more important than other animals. In: C. V. Blatz (ed.) *Ethics and Agriculture*. pp 478–487. University of Idaho Press, Moscow, ID.
- Brower, M., and W. Leon. 1999. *The Consumer's Guide to Effective Environmental Choices: Practical Advice from the Union of Concerned Scientists*. Three Rivers Press, New York.
- CAST. 1981. *Scientific Aspects of the Welfare of Food Animals*. Report No. 91. Council for Agricultural Science and Technology, Ames, IA.
- CAST. 1997. *The Well-Being of Agricultural Animals*. Report No. 130. Council for Agricultural Science and Technology, Ames, IA.

- CAST. 1999. Animal Agriculture and Global Food Supply. Report No. 135. Council for Agricultural Science and Technology, Ames, IA.
- Cheeke, P. R. 1999. Shrinking membership in the American Society of Animal Science: Does the discipline of poultry science give us some clues? *J. Anim. Sci.* 77:2031–2038.
- Coats, C. D. 1989. *Old MacDonald's Factory Farm*. Continuum Publishing, New York.
- Craig, J. V., and J. C. Swanson. 1994. Review: Welfare perspectives on hens kept for egg production. *Poult. Sci.* 73:921–938.
- Dolan, Jr., E. F. 1986. *Animal Rights*. Franklin Watts, New York.
- Durning, A. B., and H. B. Brough. 1991. *Taking Stock: Animal Farming and the Environment*. Worldwatch Paper 103. Worldwatch Institute, Washington, DC.
- Farm and Country. 1992. Cows with no legs? *Farm and Country* 2:2.
- Foundation for Animal Care Saskatchewan. undated. *Animal Agriculture: Our Living Business*. Foundation for Animal Care Saskatchewan, Saskatoon, Canada.
- Fox, M. A. 1999. *Deep Vegetarianism*. Temple University Press, Philadelphia, PA.
- Fox, M. W. 1984. *Farm Animals: Husbandry, Behavior and Veterinary Practice*. University Park Press, Baltimore, MD.
- Fox, M. W. 1997. *Eating with Conscience: The Bioethics of Food*. New-Sage Press, Troutdale, OR.
- Fraser, A. F., and D. M. Broom. 1990. *Farm Animal Behaviour and Welfare*, 3rd ed. Baillière Tindall, London.
- Fraser, D. 1999. Animal ethics and animal welfare science: bridging the two cultures. *Appl. Anim. Behav. Sci.* 65:171–189.
- Fraser, D. 2001. The culture and agriculture of animal production. *J. Appl. Anim. Welfare Sci.* (In press).
- Fraser, L., S. Zawistowski, J. Horwitz, and S. Tukul. 1990. *The Animal Rights Handbook*. Living Planet Press, Los Angeles, CA.
- Gold, M. 1983. *Assault and Battery: What Factory Farming means for Humans and Animals*. Pluto Press, London.
- Gruzalski, B. 1983. The case against raising and killing animals for food. In: H. Miller and W. Williams (ed.) *Ethics and Animals*. pp 251–263. Humana Press, Clifton, NJ.
- Harrison, R. 1964. *Animal Machines*. Vincent Stuart, London.
- Herscovici, A. 1996. *Food for Thought: Facts about Food and Farming in Canada*. Ontario Farm Animal Council, Mississauga, Canada.
- Hill, J. L. 1996. *The Case for Vegetarianism: Philosophy for a Small Planet*. Rowman and Littlefield, Lanham, MD.
- Hodges, J. 2000. Why livestock, ethics and quality of life? In: J. Hodges and I. K. Han (eds.) *Livestock, Ethics and Quality of Life*. pp 1–26. CABI Publishing, Wallingford, U.K.
- Hurnik, J. F., and H. Lehman. 1988. Ethics and farm animal welfare. *J. Agric. Ethics* 1:305–318.
- Hursey, B. S. 1997. Towards the twenty-first century—the challenges facing livestock production. *World Anim. Rev.* 89:ii–iii.
- Johnson, A. 1991. *Factory Farming*. Blackwell, Oxford.
- Kopperud, S. 1993. So what's the beef about animal rights? *Agric. Eng.* 74:23–24, 32.
- Kornegay, E. T., and D. R. Notter. 1984. Effects of floor space and number of pigs per pen on performance. *Pig News and Information* 5:23–33.
- Lappé, F. M. 1971, 1982. *Diet for a Small Planet* (1st ed., 1971; 10th anniversary ed., 1982). Ballantine, New York.
- Marcus, E. 1998. *Vegan: The New Ethics of Eating*. McBooks Press, Ithaca, NY.
- Mason, J., and P. Singer. 1980. *Animal Factories*. Crown Publishers, New York.
- McFarland, C. 1990. *Cows in the Parlor*. Macmillan Publishing, New York.
- Mearns, R. 1997a. Balancing livestock production and environmental goals. *World Anim. Rev.* 89:24–33.
- Mearns, R. 1997b. Livestock and environment: potential for complementarity. *World Anim. Rev.* 88:2–14.
- Ministry of Agriculture, Fisheries and Food. 1988. *Codes of Recommendations for the Welfare of Livestock: Domestic Fowls*. Leaflet 703. Ministry of Agriculture, Fisheries and Food, Alnwick, U.K.
- NCBA. 1998a. *Animal Welfare*. Available at National Cattlemen's Beef Association home page. <http://www.beef.org/libref/beefhand/animl.html>. Accessed Dec. 14, 1998.
- NCBA. 1998b. *12 Myths and Facts about Beef Production*. Available at National Cattlemen's Beef Association home page. [http://www.beef.org/librfacts/myths\\_facts.htm](http://www.beef.org/librfacts/myths_facts.htm). Accessed Dec. 14, 1998.
- NCBA. 1998c. *Myths & Facts about Meat Consumption*. Available at National Cattlemen's Beef Association home page. [http://www.beef.org/beef/nut\\_libr/myths.htm](http://www.beef.org/beef/nut_libr/myths.htm). Accessed Dec. 16, 1998.
- NPPC. 1998. *How Hogs are Raised Today—The Tradition of Care Continues on America's Hog Farms*. Available at National Pork Producers Council home page. <http://www.nppc.org/how.hogs.are.raised.html>. Accessed Dec. 16, 1998.
- NPPC. 2000. *Farmtastic Voyage*. Available at National Pork Producers Council home page. <http://www.nppc.org/ForKids/farmtastic.html>. Accessed May 29, 2000.
- Newkirk, I. 1990. *Save the Animals! 101 Easy Things You Can Do*. Warner Books, New York.
- North, M. O. 1984. *Commercial Chicken Production Manual*, 3rd ed. AVI Publishing, Westport, CT.
- North, M. O., and D. D. Bell. 1990. *Commercial Chicken Production Manual*, 4th ed. Van Nostrand Reinhold, New York.
- NCDACS. 2000. *Kid's World—Barnyard Palace*. Available at North Carolina Department of Agriculture and Consumer Services home page. <http://www.agr.state.nc.us/cyber/kidswrld/general/barnyard/barnyard.htm>. Accessed March 17, 2000.
- Penman, D. 1996. *The Price of Meat*. Victor Gollancz, London.
- Pimentel, D. and M. Pimentel (Eds.). 1996. *Food, Energy, and Society*, Revised Edition. University Press of Colorado, Niwot, CO.
- Preece, R. 1999. *Animals and Nature: Cultural Myths, Cultural Realities*. UBC Press, Vancouver, Canada.
- Preece, R., and D. Fraser. 2000. The status of animals in biblical and Christian thought: A study in colliding values. *Society and Animals* 8:245–263.
- Regan, T., and P. Singer (ed.). 1989. *Animal Rights and Human Obligations*, 2nd ed. Prentice Hall, Englewood Cliffs, NJ.
- Regenstein, L. 1986. *How to Survive in America the Poisoned*. Acropolis Books, Washington, DC.
- Rifkin, J. 1992. *Beyond Beef: The Rise and Fall of the Cattle Culture*. Dutton, New York.
- Robbins, J. 1987. *Diet for a New America*. Stillpoint Publishing, Walpole, NH.
- Rollin, B. E. 1995. *Farm Animal Welfare: Social, Bioethical, and Research Issues*. Iowa State University Press, Ames, IA.
- Rosenwald, A. S. 1981. *First European Symposium on Poultry Welfare held*. *Poult. Dig.* 40:576–582.
- Ross, C., and S. W. Wallace. 1991. *The Amazing Milk Book*. Kids Can Press, Toronto.
- Schillo, K. K. 1998. Toward a pluralistic animal science: Postliberal feminist perspectives. *J. Anim. Sci.* 76:2763–2770.
- Sen, A. K. 1982. *Poverty and Famines*, Second edition. Oxford University Press, New York.
- Sequoia, A. 1990. *67 Ways to Save the Animals*. HarperCollins, New York.
- Singer, P. 1975, 1990. *Animal Liberation* (1st ed., 1975; revised ed., 1990). Avon Books, New York.
- Sorabji, R. 1993. *Animal Minds and Human Morals: The Origins of the Western Debate*. Cornell University Press, Ithaca, NY.
- Thompson, P. B. 1998. *Agricultural Ethics: Research, Teaching, and Public Policy*. Iowa State University Press, Ames, IA.
- Thompson, P. B. 1999. From a philosopher's perspective, how should animal scientists meet the challenge of contentious issues? *J. Anim. Sci.* 77:372–377.