medical progress, some as scientists and some as leaders in comparative medicine, were elected to the Institute of Medicine, part of the National Academy of Sciences. Veterinarians Myron “Max” Essex from Harvard and John B. Glen of Scotland received the Lasker Award—Glen in 2018 for his discoveries of the antiparasitic drug propofol and for short-acting anesthetics. The ultimate award came in 1996, when Peter Doherty, an Australian veterinarian, won the Nobel Prize for Medicine for discoveries on how white blood cells attack and kill virus-infected cells. William C. Campbell, trained in the Veterinary Science Department at the University of Wisconsin, won the Nobel Prize for the discovery of the drug avermectin and its derivative, ivermectin—both alleviating parasitic infection in livestock and people.

Despite the emerging duties of veterinarians in public health and zoonotic diseases, and their role in food safety, economic downturns occasionally lead to zany changes in the food industry that can lead to disaster. In 1988, an unusual case cluster of human thyrotoxicosis—an increase of thyroid hormone—appeared. It was traced to a slaughterhouse that had put thyroid glands of cattle carcasses in its ground beef; people had been poisoned by eating thyroid tissue in their burgers.

37. THE GENDER SHIFT

The April 1897 issue of the American Veterinary Review carried news from England that Principal Williams of the New Veterinary College in Edinburgh, Scotland, had brought suit against the Royal College of Veterinary Surgeons in London to compel the RCVS to admit for its licensing examination a “lady” who had qualified academically but was refused by the examiners on account of her sex. An accompanying editorial in the journal by an American veterinarian noted that of all learned societies, that of veterinary surgeon was least appropriate for women, and concluded there would be no need for lawsuits “if women, instead of seeking notoriety by any means in their power, would be content to fulfil those duties for which they are fitted by nature . . .”

A half-century later, the view in much of rural America had not changed in a way that mattered. To midwestern farm boys of the 1940s, it had seemed as if most rural veterinarians were honest, capable, and tough men—their work required both strength and physical stamina, and caution was required to deal
with danger of large animals. News was not uncommon of veterinarians killed on the farm—gored by a dairy bull, kicked in the head by a horse, or fatally infected with glanders. The occupational hazards of the job were real and, like service in the infantry, viewed as man’s work.

Rural practice was often dirty and smelly. Evaluations for pregnancy and reproductive disease required that veterinarians spend a good bit of time with their arm up to the shoulder in a cow’s rectum and colon. There were almost no female veterinarians practicing in small towns of the Midwest in the prewar 1930s. At least I never heard of one. The six veterinary colleges in the Midwest/Great Plains—Iowa State College, The Ohio State University, Kansas State College, Colorado State College, Michigan State College, and Texas A&M College—did not or only rarely did admit women for study.

It was not only the physical demands that excluded women in the mind of the farmer, but that a great deal of the work of the veterinarian dealt with items farmers typically deemed not appropriate for the company of women. Veterinarians had to deal with abnormalities of the penis, infections of the genital organs, injuries arising from mating, and, most of all, castration of young male animals. The view was that these tasks were to be done where women of the farm were not present. This exclusion fit with the male camaraderie and earthy ambience of the veterinarian’s visits to the farm and an accompanying tendency to sustain primal humor that even churchgoing Methodists could adopt. One of the stories passed around was about an elderly farmer who had a stud horse that would not perform. To get him more interested, the veterinarian prescribed a syrupy green tonic. After one dose, the horse improved greatly, mounting several mares. When his inquisitive neighbor asked what was in this tonic the farmer replied, “I don’t know but it tastes like mint.”

Admission of women to U.S. veterinary schools began in the 1930s in the midst of progressive movements during the Great Depression. Progress was slow and singular.” By 1838 there were twenty-one female veterinary graduates in the U.S., and ten more were added the next year. None had gone into scientific research—perhaps because none were asked or even encouraged.

Two women got into veterinary science through the back door of science. In 1938, Margaret Sloss had been the first female to graduate with a veterinary degree from Iowa State College. Not approved through the standard admission process, she had chipped away at veterinary courses as a graduate student
in veterinary pathology until the faculty agreed that she could be a special case and finish the clinical courses for graduation. Her friend and colleague Lois Calhoun followed the next year; she began as an anatomy technician and spent her career as professor and head of the Department of Anatomy at Michigan State College. Both Sloss and Calhoun had been “special cases” and were not included in the official class picture. But decades later, both were celebrated for their lifelong roles in the advancement of women in science, surviving professionally in a difficult and repressive time for women.

In 1944, Margaret Sloss was invited by Eleanor Roosevelt to a luncheon for women’s activists at the White House in Washington, D.C. A college leader told her that if she accepted the invitation, he would see to it that she would not be employed at Iowa State; Sloss did not go to Washington. She would never reveal who had put the kibosh on her trip to the White House, but fingers pointed to veterinary medicine dean Henry Bergman.

World War II stopped women’s entry into veterinary schools in the U.S. At Iowa State College, Dean Bergman’s daughter, determined to be a veterinarian, was blocked in admission by her father. The medieval mix of tradition,
patriotism, and duty that ruled over prospective students was not limited to women. The son of Professor Edward Benbrook, taking his father’s course in veterinary pathology, received a failing grade. Forced to wait a year to repeat the course, he was drafted into the Army. At the end of the war, Stanley Benbrook returned to complete his veterinary degree and to specialize in veterinary pathology, his father’s discipline.

When women replaced men in many home front jobs during World War II, there had been a liberating phenomenon that didn’t go away. Young girls having an interest in science in the 1950s were no longer persuaded to bypass veterinary medicine as a career. Graduating from high school with more science and superior in pre-veterinary science courses, they were being selected by veterinary colleges for their entering classes. Foremost in the gender shift in veterinary medicine was the increasing interest of women in science and animal health. The rise involved a spectrum of societal change that included greater participation of females in biological sciences in K–12 education to motivational factors that drive women into veterinary medicine.

It was a long overdue sign of success. The trend had begun in the 1950s and was a welcome and encouraging sign of the progress of women in science. By the 1980s, women outnumbered men in the veterinary school at Cornell; that change was slower in rural areas of the Midwest. Iowa State College, dominated by rural agriculture, was a latecomer and had not admitted women to veterinary school until the 1960s. A decade later, surprising everyone—academicians and demographers alike—was the rapid and dominating increase of women in veterinary medicine.

Equally surprising in this gender shift was a downside, the declining interest of men in veterinary medicine as a career. In the fall of 2002, Iowa State University admitted 105 students to the freshman veterinary class, 23 of them men—22 percent males, the lowest in the history of the college. The numbers reflected a continuing trend in colleges of veterinary medicine in North America; one midwestern college that year reported only 4 men in a class of 104. Beginning in the 1990s, the gender of entering students became even more skewed—sufficiently so to suggest that something was wrong—just as it was when males dominated the profession (see appendix VII).

In rural America, the gender shift was due in part to changes in agricultural production. Moves to mechanized agriculture from horsepower in the 1930s,
and then to large commercial enterprises that used fewer veterinarians, led to a decline of farm families that traditionally supplied male students to agriculture and veterinary medicine in land grant universities. There was a decline in the number of students interested in production animal medicine.

Were economic issues driving the gender shift? Salaries offered in the private sector had not increased appropriately to the costs of education and student debt load. No longer competitive with medicine, dentistry, or other health professions, salaries were perhaps a major reason that men were bypassing application to veterinary school. In the *New York Times* for Sunday, June 9, 2002, an article by Yilu Zhao headlined “Women Soon to Be Majority of Veterinarians” quotes Debra Nord, director of Princeton’s program in the Study of Women and Sexual Difference: “The expectation today is that if the men do not provide the full household income, they should at least provide the major part of it. A lot of men also do not expect their wives to earn full salaries in the child-bearing years.”

Many female veterinarians who matured in the 1960s achieved fame for their work in an astonishing array of scientific problems: veterinary pathologist Janice Miller discovered the bovine leukemia virus at the University of Wisconsin; Lisa Nolan pursued the molecular biology of *E. coli* infections in animals; Joan Hendricks studied circadian rhythms and the molecular biology of sleep disorders using a fruit fly model at the University of Pennsylvania. Patricia Conrad of the Coastal and Marine Sciences Institute at the University of California, Davis, worked with pathogenic protozoa; veterinary microbiologist Margie Lee developed expertise in epidemiology of meat- and poultry-borne food pathogens; clinical pathologist Claire Andreasen promoted the science of education and joined Joan Hendricks as a pioneer in the One Health program; veterinary pathologist Linda Cork investigated the retroviral-caused caprine arthritis and encephalitis; and Corrie Brown at the University of Georgia contributed to the international monitoring and control of global infectious diseases of animals.

There are other women who did their graduate work in veterinary science and, although not veterinarians, made major contributions to animal health. Linda Saif at the Ohio Agricultural Research and Development Center was elected to the National Academy of Sciences and the National Academy of Inventors for her research in viral enteric diseases of animals, especially those
transmissible to humans. An expert in coronaviruses, she served on the World Health Organization study of the SARS coronavirus.

What we know about livestock behavior and its use in preventing cruelty and promoting humane treatment, especially during slaughter, has been created by animal scientist Temple Grandin. Born of a wealthy Boston family, she used her autism to understand the animal’s response to pain. Named one of 2010’s one hundred most influential people in the world by *Time* magazine, and elected to the American Academy of Arts and Sciences and National Women’s Hall of Fame, Grandin has changed the way commercial livestock are handled and processed.

Hannah Carey, professor in the School of Veterinary Medicine at the University of Wisconsin and an expert on the gut microbiome during mammalian hibernation, was elected to the presidencies of the American Physiological Society and FASEB—the Federation of American Societies for Experimental Biology—a conglomerate of twenty-nine scientific groups with 130,000 members worldwide.

Nutritionist Catherine Woteki had worked at the Universities of Maryland and Nebraska and was dean of Agriculture and Life Sciences at Iowa State from 2002 to 2005, when she left to be the chief scientist for the U.S. Department of Agriculture from 2010 to 2015, with responsibilities for the Research, Education and Economics unit, which administered the Agricultural Research Service, National Institute of Food and Agriculture, the Economic Research Service, and the National Agricultural Statistics Service, as well as the National Agricultural Library and the National Arboretum. She was elected to the Institute of Medicine and was a major force in nutrition, food safety, and agricultural risk policy for two decades. Woteki was fired by President Trump, who nominated a radio talk show host as her replacement as chief scientist.

38. BIOPOLITICS

The Biological Weapons Convention of 1972—its official title was The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction—was designed as a supplement to the 1925 Geneva Convention, which prohibited the use but not possession or development of the weapons