

The Veterinarian, Guardian Of Animal and Public Health

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It is a great honor to participate in the program arranged for this historic occasion. The contributions that Iowa State College has made to the betterment of agricultural America have amply justified the faith of its founders. The enduring greatness of this college is based on the unstinted devotion of those men and women who for 90 years have constituted the faculties.

As a member of the faculty of a sister institution, it is my pleasant duty to convey to you warmest greetings and congratulations from Dr. Victor Johnson, Director of the Mayo Foundation of the Graduate School of the University of Minnesota.

Today much of the world's population, outside of the Western Hemisphere, is hungry. To insure adequate nutrition for our own people and provide lifesaving and morale-building food for those less fortunate, we must keep our livestock healthy and reduce preventable losses to a minimum. This is a formidable task; our livestock industry is of prodigious size. It provides food for millions of people and is the means of livelihood for millions of farmers and others associated with the care, handling and selling of animals. Yet the well-being, in fact the very existence, of these indispensable resources is at all times dependent on the ability of man to combat successfully the constant menace of disease. Animal husbandry without the benefits of modern veterinary services would be as hazardous as undertaking a

¹ Reprinted from a speech given at the ninetieth anniversary banquet of Iowa State College and appearing in the publication honoring that event.

major military campaign without the services of the Army Medical Corps. The consequences would be equally catastrophic.

Medicine may be defined as the science and art pertaining to the prevention, cure or alleviation of disease. Veterinary medicine is that branch of medical science that deals particularly with the diseases of animals. However, veterinarians and physicians are fundamentally concerned with identical problems: the diagnosis of disease, its treatment or alleviation, and its prevention and control.

In the pursuit of his professional activities, the veterinarian functions in four distinct though somewhat overlapping fields: (1) administering to sick and injured animals, (2) protecting the livestock industry against losses from infections and parasitic diseases, (3) investigating problems of basic importance to the medical sciences and (4) protecting the public against diseases of animals that are communicable to man.

With each passing year it becomes more apparent that all branches of the medical sciences are definitely related and that each is an important and vital part of the whole. If mankind is to obtain the greatest benefits from modern scientific accomplishments, the interrelation of human and veterinary medicine must be more widely recognized and intensified.

Veterinary medicine, as it applies to the treatment of sick and injured animals, had its beginnings in antiquity. The study of the anatomy of animals was founded by Aristotle more than three centuries before the beginning of the Christian era.

However, little of our present knowledge of veterinary medicine was contributed by those who practiced the art before the modern era. The treatment of sick animals was for the most part shrouded in superstitions and for centuries it was purely empirical.

Of some significance in the evolution of the study of diseases of animals were the Crusades (eleventh through thirteenth centuries). Since the Crusaders used horses to a great extent, the health of their animals was of primary importance. Another factor accounting for the emphasis placed on the study of the horse in health and disease during the Middle Ages was the popularity of horsemanship among the nobility. Furthermore, as Stange pointed out, the military power of various ruling kings was dependent largely on "horsepower" and campaigns could be won or lost depending on the condition of the horses.

It was not until the beginning of the present century that serious attention was given to the study of other domesticated animals. In fact, the horse maintained a dominant position in the course of study in veterinary schools until the past two decades, when the economic importance of cattle, sheep and swine made the intensive study of their diseases imperative.

The modern era in veterinary medicine may be dated from 1762, when a school was established at Lyon, France. This venture had the blessing of Louis XV, who conferred on the institution the title "Royal Veterinary College." A year later another school for the teaching of veterinary medicine was founded at Alfort, France. Both of these schools are still in existence.

The success of the French schools demonstrated the importance of systematic, formal instruction and study of diseases of animals. In consequence several other schools of veterinary medicine were established in Europe during the last half of the eighteenth century.

The European schools of veterinary medicine were controlled and supported by the state. In contrast, the first veterinary schools in the United States were privately organized and privately owned.

The first of a long list of such schools was organized in New York in 1857. Eventually, however, schools of veterinary medicine were established in several of our state educational institutions. These state-supported schools were better able to meet the increasing need of a broader educational training of veterinarians than were the privately owned schools. In consequence, the last of the private schools closed its doors some 25 years ago. This left the field of veterinary education the sole responsibility of state supported institutions.

It is pleasant to mention that the first school of veterinary medicine to be organized and maintained as part of a state educational system is the one at Iowa State College, established in 1879.

Indicative of the leadership exerted by Iowa State College in veterinary education are several important events which have increased the professional stature of veterinary medicine for the past three generations. In 1887 the curriculum was extended from one to three years. In 1903 it was extended to four years. In 1911 matriculants were required to be graduates of an accredited high school. In 1931 Iowa State College became the first American school of veterinary medicine to require a minimum of one year of collegiate work for admission. These were important milestones in the development of modern veterinary education.

The history of veterinary medicine at Iowa State College has been admirably recounted by the late Dean Stange. In this very human document he provided for posterity an impressive account of the tenacity of purpose of the distinguished personalities who were occasionally defeated, but never conquered in their struggle to provide scientific information and training for the solution of problems vital to the future development of a successful agriculture. Foremost in the development of the splendid school of veterinary medicine of Iowa State College was Dr. Stange himself, who served as Dean for 27 years. His fine intellect, his idealism and his foresight properly qualify him as a giant among veterinary educators.

Professional schools for the training of veterinarians were started by educational institutions in several other states as follows: Ohio and Pennsylvania, 1884; New York, 1894; Washington, 1896; Kansas, 1905; Alabama and Colorado, 1907; Michigan, 1909; Texas, 1916; and Georgia, 1918. More recently, to meet the increasing demand for more veterinarians, schools have been authorized by the University of Illinois, the University of California, the University of Minnesota, Tuskegee Normal and Industrial Institute, the University of Missouri and the Oklahoma Agricultural and Mechanical College.

Improved Curricula

With the exit of the private schools from the field of veterinary training many significant changes in the curriculum have been and are being introduced, and the course of study has been lengthened. In addition most schools now require that students accepted for professional training have previously completed two years of pre-veterinary training of college grade.

The careful selection of all students who enter the veterinary colleges and the high academic standards now being insisted on insure a type of professional training for veterinarians comparable to that of our better medical colleges. In fact, the curriculum of the modern veterinary school includes essentially the same basic subjects as that of the modern medical school.

The present graduates of our veterinary colleges are keen-minded young men, possessed of the best of technical training and aware of their opportunities and responsibilities. These men are experts in the science of animal health. Their talents and availability provide a comforting assurance that in America, serious animal plagues, which might otherwise reduce important items of our food supply to an alarming degree, are not likely to occur.

An important factor in raising the standards of veterinary education in the United States has been the American Veterinary Medical Association. This organization, which has a membership of

approximately 9,000 graduates of recognized veterinary schools, represents all of North America. By a system of periodic inspection, it has elevated the quality of teaching provided for students in the respective veterinary schools. There are at present 11 veterinary colleges accredited by the American Veterinary Medical Association: 10 in the United States and 1 in Canada. In other parts of the world there are approximately 100 veterinary schools.

While most of the graduates of veterinary schools become private practitioners, a considerable number are employed by the various states and by the United States government. A relatively small number pursue a career of teaching or research or both.

To recapitulate: the development of veterinary medicine, like that of the other professions, has been a slow and at times a painful process. From a beginning handicapped by ignorance and superstition, a science of animal health finally emerged which has attracted men of high character and intelligence. As a consequence, the profession as now constituted requires no apologies. Its accomplishments in safeguarding the health of farm animals and of human beings are notable examples of man's ability to use facts, not alone for selfish ends but also beneficently for the welfare of society.

Economics is the pulse of our agricultural industry. Of the many factors that determine profits or losses from year to year, one of the most important is disease, both plant and animal. Fortunately, by the application of knowledge most diseases can be brought under satisfactory control and some, if sufficient effort is expended, can be eradicated. If disease is not controlled, its results may well be devastating.

In 1942 the United States Department of Agriculture estimated the total value of the livestock—including poultry—of our country as slightly more than 7 billion dollars. At present prices this figure may well be doubled. A full understanding of what this stupendous industry means to our national welfare connotes the frightening responsibilities that con-

tinuously confront the veterinary profession. Should any one of a half dozen highly contagious diseases of cattle, swine or poultry be permitted to establish itself in this country and to spread unopposed, the consequences would be calamitous. It is the responsibility of veterinary medicine as the guardian of animal health to preclude such a catastrophe. This cannot be done by the veterinarians unassisted. The intelligent cooperation of the livestock industry is imperative. Happily, the notable achievements made in the control of major animal disease problems in the United States have been accomplished by such cooperative efforts.

Although livestock in the United States and Canada is probably the healthiest in the world, we must not become complacent and assume that preventable livestock losses have been reduced to a minimum. In a report issued in 1942 by the United States Department of Agriculture the annual losses from the more important diseases of livestock and poultry were estimated at more than 500 million dollars. As a matter of fact, owing to our failure to maintain a national agency for the tabulation of all livestock mortality, precise information concerning deaths of livestock is not available. The actual value of losses of livestock is without doubt greatly in excess of the figure quoted. Furthermore, losses due to nutritional and parasitic diseases, which inflict tremendous economic damage without necessarily causing death, are impossible to compute. It has been estimated that animal losses from parasitism alone amount annually to nearly 300 million dollars. (Incidentally, the veterinary school at Iowa State College has been foremost in emphasizing the importance of control of animal parasitism to the animal health.) Other losses that are frequently overlooked are those resulting solely from injuries incidental to shipping. These losses, which are largely preventable, have been estimated at \$11,500,000 annually.

Further evidences of livestock losses which are seldom considered in estimating the over-all drain on our agricultural economy are the figures pertaining to dead

farm animals processed by renderers. Recent information indicates that there are approximately 500 rendering plants in the United States and that the sale value of their products is approximately 400 million dollars yearly. This income is derived from the sale of 64 million pounds of hides, 500,000 tons of fat and nearly 1 million tons of meat scrap. How many animals that might have contributed to our food supply are represented by these figures is problematical.

In any consideration of the economic burden to the owners of livestock and to the consumers of livestock products, the money spent on worthless drugs and nostrums should not be ignored. The United States Department of Agriculture has estimated that 10 million dollars are spent annually by livestock and poultry owners for ineffective proprietary remedies. Not only is this large amount of money wasted, but, what is more reprehensible, the condition that is treated is in many instances incorrectly diagnosed. The owner of sick livestock would have more money in his pocket and fewer regrets if he would leave the treatment of disease to his veterinarian.

It is obvious that our animal disease problems have not been completely conquered; yet, during the past 40 or more years gains of tremendous significance have been made. Let us consider a few of these.

Tuberculosis Control

From the point of view of economic loss, hazard to human health and the ubiquitous character of the disease, tuberculosis is without question the most important disease of cattle. This world-wide disease is a major problem, especially in many areas of western Europe. In the United States tuberculosis of cattle has become relatively rare, as a result of the successful plan of eradication set up cooperatively between the respective states and the federal government in 1917. At that time 5 percent of bovine animals were tuberculous. Twenty-five years later, as a consequence of the slaughter of all cattle that had reacted to tuberculin, the

incidence of infection had been reduced to 0.5 percent. In 1947 the incidence of tuberculosis of cattle in the United States was 0.2 percent. To obtain this remarkable achievement, it was necessary to test with tuberculin during a 28-year period more than 279 million cattle, of which nearly 4 million reacted to the test and were slaughtered. Approximately 250 million dollars have been spent in carrying out this program but, considering the results achieved, the cost has not been excessive. In the long history of man's conflict with his microbial enemies there is not a more brilliant chapter than that recounting the conquest of bovine tuberculosis in the United States by the veterinary profession.

Hog Cholera Studies

Hog cholera is a disease of animals with which the farmers of Iowa are too familiar. This practically world-wide disease is without question one of the most devastating of all animal ailments. It has caused enormous losses in the United States for more than a century. The money value of losses in a single year has been as high as 65 million dollars.

The first successful attack on hog cholera was the direct consequence of a series of brilliant investigations conducted near Ames by Drs. Marion Dorset, C. N. McBryde, and W. B. Niles, of the Bureau of Animal Industry, during the years 1904 to 1906. These investigators proved unequivocally that hog cholera is caused by a virus, not by the so-called hog-cholera bacillus, and that hogs which recover from an attack of the disease are thereafter immune. On the basis of these observations, Dorset and his associates soon developed a method of immunization of swine against hog cholera. The experience of more than 40 years since this epochal discovery was announced has confirmed the correctness of the original observations.

The importance of this contribution to American agriculture cannot be overestimated. It probably did more to stabilize the swine industry than any single discovery before or since. It is pleasant to relate that the method of immunizing

swine against hog cholera was patented in the name of Dorset with the stipulation that the method could be used by any person in the United States without the payment of royalties.

The campaign to eradicate Texas fever, or, more correctly, cattle tick fever from the cattle of the United States is probably the most stupendous and protracted attack ever made on a major parasitic disease. The success of the campaign to eliminate the tick, *Boophilus annulatus*, which serves as the intermediate host for the protozoon responsible for this disease, is truly one of the notable accomplishments of medical science.

For more than a century before the cause of the disease was definitely known, cattle tick fever had been the most serious obstacle to the cattle industry of our southern and southwestern states. Early in the present century the yearly losses due to this disease were estimated at 40 million dollars. Until the cause of the disease was definitely established and the role played by the tick in its transmission was discovered, effective means of combating this disease were unknown.

The tangible benefits of the campaign to conquer cattle tick fever, which began in 1906, include (1) nearly 50 percent greater productivity of dairy cattle in previously tick-infested territories; (2) an increase in the size of dairy herds and improvement of the herds by the introduction of purebred and good grade stock; (3) an increase by several million of the total cattle population in the South; (4) organization of cow testing associations, the erection of cheese factories and creameries, and the development of a diversified agriculture; (5) a marked increase in the value of farms that have been freed from the cattle fever tick.

Eradication of the parasite responsible for the transmission of cattle tick fever has returned to the people of the South untold millions of dollars and made possible a prosperous cattle industry in a large area of our country in which this was not possible previously. The brilliant research that proved the tick responsible for the transmission of cattle fever and the successful fight against the cattle tick

which followed stand as one of the finest achievements of veterinary medicine.

Time will not permit more than brief mention of other significant contributions to our agricultural economy. Foremost of the other animal diseases that threaten the economic welfare of the American farmer are brucellosis of cattle and swine and pullorum disease of chickens. For both of these conditions veterinary medicine has provided methods of control, if not of eradication. Other important animal diseases that, as a consequence of research and study by veterinarians, are no longer unopposed include bovine mastitis, equine encephalomyelitis, anthrax, glanders, blackleg, fowl leukosis, distemper of dogs, rabies and an impressive list of parasitic diseases and nutritional disturbances.

When the contributions of veterinary medicine to American agriculture are examined objectively, two important conclusions emerge. The first of these is that, through knowledge gained by research and by the practical application of scientific facts, veterinarians, in cooperation with livestock owners, have contributed immeasurably to American agriculture. Without veterinary control of a host of animal diseases, pestilence, insecurity, poverty, economic disaster and insufficient food supplies would be of common occurrence.

The second conclusion which is painfully evident is that, in spite of the gains made, veterinary medicine has by no means conquered the many disease problems that still manace our livestock. However, if the profession can continue to provide a sound, basic, scientific training to young men of character, imagination, and foresight, and if society will supply adequate financial support to implement research and more research, many diseases that still exact an enormous toll from the livestock industry will be eliminated or rendered impotent. The future is challenging and the outlook is bright.

Many diseases of animals are transmissible to human beings. Consequently, their control, and their elimination when possible, is of great importance to human health.

Disease Transmission

The number of animal diseases communicable to man is uncertain. The list, however, contains many that will produce grave and disabling illness or even death. Among these are bovine tuberculosis, brucellosis, rabies, anthrax, tularaemia, glanders, psittacosis, swine erysipelas, plague, equine encephalomyelitis and more than 80 different diseases caused by animal parasites occurring in a wide variety of species of animals.

Most of the diseases of animals to which man is susceptible occur in our domesticated species. The manner by which human beings become infected varies. Infection may occur by direct exposure to the infective agent; by the ingestion of raw or inadequately cooked flesh of diseased animals, or of raw or imperfectly pasteurized milk; or by being bitten by certain blood-sucking flies, fleas, lice and ticks which serve as vectors.

The threat to human beings of those diseases of animals communicable to man has diminished in direct ratio to the ability of veterinary medicine to suppress the respective diseases in their natural hosts. For example, in the United States tuberculosis of children as a result of their drinking raw milk from tuberculous cattle practically never occurs. In Great Britain, where tuberculosis among cattle is rampant, 2,000 children die annually from tuberculosis derived from the milk of tuberculous cows.

The suppression of anthrax and glanders in their natural host has also reduced the hazard of these diseases to man. The same may be said for rabies, although this problem is far from solved. We have sufficient knowledge to eliminate rabies from our domestic animals completely within a relatively short period, but so far we have not applied this knowledge effectively. Less sentimentality and more realism in dealing with this problem are urgently needed.

Besides preventing animal diseases hazardous to human health and recognizing these diseases in sick and in dead animals, veterinary medicine has erected several other effective barriers against

animal diseases transmissible to man. These include (1) vigilant state and federal veterinary regulatory services, (2) supervision of milk supplies and (3) a nationwide system of meat inspection for all meat-packing concerns engaged in interstate commerce. This system is responsible for separating unwholesome meat from that suitable for human consumption.

Another contribution of veterinary medicine to human welfare was the demonstration for the first time that an infectious agent can be transmitted from animal to animal by an insect serving as an intermediate host. This discovery, by Drs. F. L. Kilborne, Theobald Smith and Cooper Curtice, of the Federal Bureau of Animal Industry, may properly be considered one of the epochal achievements in medical research. Their solution of the mystery of cattle tick fever ultimately led to the discovery that many other important diseases are also transmitted by intermediate hosts. Other diseases transmitted by insect vectors include malaria, yellow fever, typhus fever, African sleeping sickness, Rocky Mountain spotted fever, nagana and bubonic plague.

Human Health

Although responsibility for the recognition and suppression of animal disease dangerous to human health belongs primarily to veterinary medicine, the task can be successfully accomplished only by the closest cooperation with the medical profession. Each profession has much to give the other for the betterment and protection of human welfare.

The development of veterinary medicine has been in response to a definite demand for provision of a much needed and important service. The training necessary for graduation from our veterinary schools has become increasingly technical, increasingly arduous, increasingly prolonged and increasingly expensive. The graduates possess an educational equipment comparable to that possessed by those trained for the other branches of the medical sciences.

Stock owners and poultrymen are becoming better informed with every passing year. They are entitled to, and will demand, the best that modern veterinary medicine can provide. Incompetence and complacency on the part of veterinary medicine will not and should not be tolerated. Unless the profession keeps not only abreast but a little ahead of the times, confidence will be lost and other means will be sought to meet the disease problems of our livestock industry.

Educators Needed

The task of providing and maintaining a veterinary service commensurate with its present and future responsibilities rests largely with the faculties of our veterinary schools. It is here that the future is confronted with a serious uncertainty. The availability of qualified men in sufficient numbers to staff our existing schools properly is a source of deep administrative concern. Men capable of the best in teaching and research are the products of long and expensive specialized training. Unfortunately, entirely too few graduates of promise for a career of teaching or research have been willing to accept a meager salary and devote a lifetime to the dissemination of knowledge and to exploration of the unknown. There must be a realization by the state that the teaching and research staffs of professional schools are subject to a highly competitive market. To obtain and retain competent teachers and investigators it has become increasingly necessary to meet this competition, not by adequate salaries alone but by providing for every member of the staff conditions that will permit the most satisfying career.

Facilities and time should be available to so-called full-time teachers for at least a modest research program. The really great teachers of the medical sciences speak from their workbenches and, as a consequence, their teaching has that quality of truth that is the essence of all knowledge. Science is ever-changing and what was considered to be true yesterday may not necessarily be true today or tomorrow.

Finally, veterinary medicine and American agriculture in partnership must continue to wage an uncompromising attack on the world's two most basic problems, hunger and disease. The record of past accomplishments is unsurpassed. However, to meet the unpredictable demands of the future may well tax our capacities to a degree beyond our present abilities to foresee. Without doubt agriculture could function more efficiently if relieved of the burden of animal diseases. To reduce this burden to the vanishing point must be the principal future objective of veterinary medicine. With staunch and intelligent leadership and a continuing acceptance of social responsibility the veterinary profession can meet this challenge with distinction. This would be an achievement exemplifying the highest function of science: to provide and apply significant truths for the service of man.

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Increase Turkey Sales

An extensive advertising campaign by Minnesota turkey raisers and distributors increased sales of dressed turkeys up to 30 percent in the month of September.

Winter, 1949

Newcastle Vaccine

Vaccination for Newcastle disease, today's fastest spreading threat to American poultry flocks, is still in the experimental stage.

According to the American Veterinary Medical Association's committee on biological products, headed by Dr. H. E. Biester of the Division of Veterinary Medicine at Iowa State College, it is not ready to accept the chicken embryo vaccine for Newcastle disease at this time.

Current efforts to develop a more efficient vaccine may prove fruitful, the committee said, but further evidence is needed to show that the present vaccine furnishes adequate protection under field conditions during an epidemic of Newcastle disease.

To meet a constant need for more information on the various biological products for veterinary use, the committee recommended that the virus-serum division of the BAI be given authority beyond mere control efforts. The activities of the BAI should be extended, the committee said, to include research on the development of new products.

Swine Dysentery

The committee on diseases of food animals of the American Veterinary Medical Association reported to the 1947 convention that part of the alarming loss of spring pigs was caused by an unidentified type of infection; probably of a virus nature.

If a repetition is to be avoided next spring, the committee declared that there must be a more thorough understanding of the infections and factors now grouped under the "swine dysentery complex." Or, in other words, more effective and specific methods of preventing and controlling these conditions must be developed.

Brucellosis, hog cholera, erysipelas and tuberculosis were listed as other major problems in American swine herds.