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RELATIONSHIP OF VETERINARY SCIENCE TO ANIMAL BREEDING AND PUBLIC HEALTH—LEGAL PROTECTION OF THE PRACTISE OF VETERINARY SCIENCE[1]

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IN holding this twelfth International Veterinary Congress we have come from distant points on the globe largely because research has no national or regional boundaries. Neither does it recognize professional lines of separation. Modern veterinary service rests on a group of fundamental sciences which give the profession the stability of a scientific Gibraltar.

Procedures used in competent veterinary service and in the administration of live-stock welfare are of established soundness and practicability. This is based on broad experience with millions of animals for many years under wide ranges of conditions.

Indeed, in these times of world-wide economic stress and consequent human bewilderment, these large-scale veterinary and administrative experiences with our animal empires may offer a promising field for study in connection with human relationships. Possible applications of work with animals to human affairs occur especially in selective matings, control of numbers, planes of nutrition, adjustment of labor to quantity of work, identification of individuals and large-scale measures to improve health and reduce mortality.

Accordingly, it is hoped that the deliberations of

[1] Address by the president of the Twelfth International Veterinary Congress, Waldorf-Astoria Hotel, New York, N. Y., August 13 to 18, 1934.

this twelfth International Veterinary Congress may merit the attention not only of scientific workers throughout the world, but also of our statesmen, economists and all thoughtful people seeking to find a key to greater human welfare.

VETERINARY SCIENCE AND ANIMAL BREEDING

The subject on which I have the honor to address you involves three topics, which for many years have received the attention of the veterinary profession. Though seemingly diverse, these branches of activity —animal breeding, public health and legal protection of veterinary practise—are nevertheless closely related. In fact, they have their origin in a common root deeply embedded in the soil of tradition. They symbolize man's efforts to surmount the risks of his existence on this earth.

The practise of animal breeding is centuries old. It had its origin in the economic need of ancient man to produce animal life under some form of organized human control. In the oldest laws in the world, known as "The Laws of Hammurabi," it is indicated that some sort of regulatory system over animal breeding existed in Babylonia 2,100 years before the advent of the Christian era. Any one who regards the chicken industry of to-day as a modern economic development might peruse the laws of the old Assyrian Empire with interest. The numbers of eggs laid by each hen were counted and recorded.

In that early and now dim date in man's history many of the diseases of animals and poultry were identifiable by names peculiar to the times. The contagious nature of animal plagues is clearly indicated by Columella, who lived at the dawn of the present civilization. That he recognized a relationship between animal breeding and public health is evident from his urgent demand for segregation of the sick as one means of preventing the spread of infection. The Christian era was still very young when Vegetius, aroused by the heavy losses among animals as each successive epizootic broke over the world, utilized his now immortal pen for the salvation of animal life if only on economic grounds, to save the state from loss, through a revival of interest in what then was known as veterinary art.

In those days of scientific darkness, animal-disease prevention and control were largely in superstitious practises. But the few intellectual freedmen of the age, and those in gathering numbers in each succeeding epoch, realized the need of a true veterinary practise and control over animals and animal production, as related to public health and public welfare generally. As far back as B.C. 40, in the time of Tiberius, Celsus foresaw that methods employed in veterinary clinical work would find a place in the practise of human medicine which two hundred years later Galen emphasized.

Since then, and particularly since the time of Pasteur, veterinary science has been marked by a succession of discoveries which have had the effect of greatly reducing the hazards of animal life and production. Diligent scientific workers, the world over, have traced scores of live-stock maladies to their source, revealing specific viruses, bacteria and parasites as the causes. Other investigators have cleared up many questions concerning nutritional disturbances, poisoning by plants, breeding troubles, even conditions resulting from abnormal glands and disturbances of the nervous system.

Literature on these various contributions of veterinary science is voluminous and familiar to members of this body and their colleagues. Hence, instead of dwelling on past achievements, perhaps our time may be better spent in considering some less often discussed phases of veterinary activities.

In commercial gatherings, for instance, the question of the distribution of goods engages the paramount interest of trade bodies, international as well as national and local. Ours is a scientific and professional assembly, but we also have a problem of distribution, namely, the distribution of veterinary knowledge more generally and more effectively.

Scientists from various countries frequently visit the laboratories of our Bureau of Animal Industry, sometimes remaining several months. They quickly become familiar with our equipment and methods; in fact, they frequently are more at home in our laboratories than in our cities and rural districts. But judging from discussions with these workers and also from data obtained in a recent world survey on live-stock improvement, there is a wide difference among countries in methods by which veterinary science is brought to bear on animal production.

An account of our experience with this question in the United States may be of interest and provide a basis for a helpful interchange of views.

In this country we have about 10,000 practising veterinarians. Approximately 5,000,000 live-stock owners engage in commercial production. The population of cattle, swine, sheep, goats and equine stock is about 200,000,000. A comparison of these figures reveals a ratio of 1 veterinarian to 500 live-stock owners; and a ratio of 1 veterinarian to 20,000 animals.

Thus, it becomes clear that the influence of the individual veterinarian must be extended greatly if his knowledge is to have an extensive application to the business of animal breeding and production.

In dealing with this condition the Bureau of Animal Industry long ago recognized the need for a

definite and consistent policy. Without an established procedure the application of veterinary science to animal breeding would be influenced excessively by personal opinion of various officials. Uniformity in different parts of the country would be lacking. Irregular demands for veterinary service would be created, with consequent disturbing effects on veterinary education.

System of Regulation and Information

The governmental policy of the United States, therefore, consists of both regulatory and informational services.

The regulatory feature includes essentially international and interstate inspection, together with the operation of necessary quarantine stations and disinfecting and dipping facilities. It provides for the immunization of swine which leave public markets for rural points where they are to be used for breeding purposes or further fattening and finishing. It includes supervision over vessel fittings, in connection with the export of live stock, and suitable facilities for feed, water and rest for live stock shipped long distance by railroad.

In this regulatory work is an extensive meat-inspection service, which shall be considered more in detail in another place.

Furthermore, the Bureau of Animal Industry cooperates with states in the eradication of animal diseases, particularly those of dangerous character. Such work is conducted under the laws of the various states, by cooperative agreements between the government and the state. Although these activities are carried out by federal and state veterinary inspectors, the Bureau of Animal Industry maintains lists of private veterinary practitioners who are qualified for such duties.

All these official duties are systematically and continuously conducted. In general, they have been highly effective in accomplishing the results for which they are intended. An effective barrier has been raised against the spread of animal disease from one part of the country to another. The health of live stock in transit has been safeguarded. The eradication or control of many serious maladies has been accomplished.

But, far-reaching as are these regulatory measures and procedures, the Bureau of Animal Industry recognizes the need for the widest extension of its services to the millions of farmers, ranchers and other owners of the nation's live stock. And so, where official regulatory work leaves off, a planned system of information begins, carrying knowledge of disease prevention and control to owners, veterinarians, public officials and all others interested in live-stock welfare.

Many tested methods of distribution are utilized for this informational service. These include the press, agricultural extension agencies, publications, motion pictures, exhibits, other pictorial matter and radio broadcasting. As an example of the scope of this informational work, the Bureau of Animal Industry has prepared 67 publications that deal with animal diseases. Of these, all told, about a million copies a year are circulated throughout the country. Appreciating the value of educational motion pictures in improving stock raising, we have prepared 50 motion pictures of which 13 deal with disease control and live-stock health. Last year showings of these pictures were made on about 300 occasions before audiences aggregating about 80,000 people.

Cooperation with and by Practising Veterinarians

The distributed information is of a character that live-stock people can use to specific advantage, and our experience indicates its constructive value. It familiarizes owners and others with the importance of disease and parasite control. It overcomes misinformation, prejudice and superstition. It emphasizes the value and need of qualified veterinary service, as contrasted with ineffective, wasteful and often cruel methods.

For instance, in its educational work on hog-cholera control, the Bureau of Animal Industry acquaints swine growers with the value of the preventive-serum treatment, and the sanitary precautions that help to keep swine herds free of cholera, but it also points out the importance and desirability of having a qualified veterinarian apply the preventive-serum treatment when needed.

Another example where the educational work of the bureau should not involve recommendations or activities that would tend to conflict with the work of veterinary practitioners is in the control of horse bots, a parasite that is the cause of serious injury in some parts of the country. The educational work is organized largely by extension workers who arrange for the treating of all horses in a community. They explain the methods, benefits and cost, but the actual treatment is given by veterinarians who cooperate in the enterprise. In the case of Bang's disease, or infectious abortion, the informational service involves particularly publications and the radio broadcasting of latest results of experimental work, with suggestions that specific procedure should preferably be under veterinary supervision.

Stockmen Warned Against Ineffective Drugs

Supplementing the informational services of the Bureau of Animal Industry, the Federal Food and

Drug Administration—also a branch of the U. S. Department of Agriculture—has performed a further service. It has called public attention to a waste of millions of dollars annually spent for drugs and nostrums that are worthless in the prevention or treatment of live-stock diseases.

As a result of a five-year survey, it has been shown that though most manufacturers put out honest goods and advertise them truthfully, others make exaggerated claims unsupported by the merits of the goods so advertised.

As a result of such claims farmers have been led to believe that medicines are available that will prevent or cure such diseases as hog cholera, infectious abortion of cattle and blackhead of turkeys; that the medicines will keep their stock healthy and producing, and increase the milk yield of cattle and the egg yield of fowls. These claims lead worried farmers to believe that these so-called remedies will do things which medicines simply will not do.

Though there is lack of reliable figures on the money spent annually for proprietary remedies, several estimates indicate that it considerably exceeds ten million dollars. It is not unusual for dairymen whose incomes are very meager to spend as much as $10 a pound for worthless abortion remedies. The survey of the Federal Food and Drug Administration embraced the entire field of veterinary preparations. It included a study of more than 1,000 misbranded or worthless antiseptics, stock powders, tonics, liniments, salves, and the like. Through its informational efforts, which urge farmers, before purchasing medicines, to consult a veterinarian as to the possible effect, much of this enormous waste can be checked.

Better knowledge among stock owners concerning animal diseases should lead to a higher plane of live-stock health and increased appreciation of capable veterinary services.

Quality of Live Stock of Veterinary Interest

Any consideration of the relationship of veterinary science to animal breeding inevitably leads to the question of quality of animals as well as their numbers, for the very significant reason that owners of improved live stock not only are interested in animal-disease prevention and control, but have animals that justify veterinary services to keep them well and productive.

For more than a decade, the Bureau of Animal Industry has conducted a systematic campaign to encourage live-stock improvement. This interest involves, in particular, the production of purebred stock and the establishing of studs and herds of high breeding and utility value. Records of this activity have shown that the ownership of a few purebred animals quickly leads to the acquisition of more improved stock and to general interest in higher types of domestic animals.

In conducting this campaign, we distribute extensive printed information on animal breeding and feeding. Gratifying reports from persons who have adopted our recommendations indicate that their improved stock has a utility value fully one third greater than that of unimproved farm animals. We have also observed that when stockmen request literature on production subjects, they seek also the latest facts concerning practically all animal maladies. This is a line of work that, as a veterinarian, I have been proud to sponsor and aid.

Here mention should be made of the contact between veterinarians and poultrymen in the United States, especially in the control and eradication of tuberculosis and pullorum disease. They are in frequent consultation on the best scientific and practical means of reducing mortality in breeding and utility poultry flocks. This interest has arisen (1) through an increased attention to poultry health, (2) as a result of extensive interstate shipments, especially of baby chicks, and (3) from efforts toward general flock improvement involving the production of birds having high intrinsic value.

Thus, veterinary science and animal and poultry husbandry intertwine at many points, from breeding and health activity on farms and ranches to the inspection of exhibition animals and fowls intended for fairs and expositions. Veterinary science aids in attaining a high development of breeding. In reciprocating measure, advancement in breeding is distinctly beneficial to the veterinary profession.

Here enters public health.

Veterinary Science and Public Health

Man's interest in public health is the cooperative expression of study and effort to reduce the risks of his existence on this earth by endeavoring to surmount the threat of disease. In this is involved the fundamental subject of nutrition.

Live stock are remarkable mechanisms for converting the earth's vegetative growth into food that has become indispensable for man's needs. Meat, milk and eggs have been a part of the human diet since primitive times. With the development of complex systems of distribution, our modern civilization has required, for its protection and welfare, systems of meat and milk inspection together with supervision over other foods.

In the United States our federal meat inspection, already mentioned, involves the veterinary examination of approximately 70,000,000 food animals a year. The regulations under which meats are either passed for food or are condemned rest on established princi-

ples of veterinary science and hygiene. This service, administered by the Bureau of Animal Industry, has been in operation so many years that our citizens now accept it as a public utility.

Federal meat inspection not only is a barrier to the possible spread of infections of animals to human beings, but it provides other public health safeguards. It includes supervision of ingredients used in the curing of meats. It insures proper sanitation. In general, it surrounds the inspected meat food supply with conditions that appeal to man's sense of refinement.

MEAT INSPECTION AID SAVES HUMAN LIVES

In the administration of the meat-inspection act consideration is given to requests from reputable physicians, medical institutions and pharmaceutical manufacturers for products thought likely to be of value in human medicine. An incident that occurred in one of our central states gives a human touch to this form of cooperation. A young man 22 years old was suffering from aplastic anemia. The disease was sapping his vitality. In their extremity, hospital officials finally appealed to the federal meat-inspection service. They desired foetal calf liver as a last resort in the hope of saving their patient. Arrangements were quickly made to obtain the liver of the unborn calf under veterinary supervision. When administered, it stopped the bleeding common to this form of anemia. Nothing else had seemed to have any effect.

This combined medical and veterinary procedure has had a happy ending in the complete recovery of not only this young man, but numerous other patients afflicted with the same disease, whose previous condition had been desperate.

The veterinary supervision of animals at time of slaughter is also the basis for an extensive pharmaceutical industry, as my colleagues who are engaged in the administration of meat-inspection activities are well aware. Mankind has come to depend on the glands and other parts of animal bodies for scores of preparations used in the treatment of human ailments.

Similarly, manufacturers of antitoxins, serums, bacterins and other biological products utilize methods many of which have their origin in veterinary science; in fact, numerous establishments licensed by the Bureau of Animal Industry for the production of biologics produce these articles for both medical and veterinary use.

VETERINARY SERVICE PROTECTS MILK SUPPLIES

In the case of milk supplies, sanitary control of this fluid has been vested largely in medical officers. They, in turn, through a broad conception of the problem, have seen the need of veterinary inspection as well. The veterinarian applies the tuberculin test, observes dairy herds for other possible infections and performs related services coming within his qualifications. The medical profession commonly centers its attention on the purity of fluid milk and cream and their products, with respect to compliance with established grades and standards.

This joint supervision has brought remarkable improvements in the wholesomeness of milk supplies with well-recognized benefits to public health through reduction of tuberculosis, typhoid fever, septic sore throat and other maladies.

The relationships between medical and veterinary science are especially illustrated in the field of anthelmintics for parasitism of man and his animals where they are so close that they merge into a common interest. Of specific maladies that intrude on the health of both the human and the lower animals, the more familiar include anthrax, rabies, tuberculosis, milk sickness and parasitic infestations. In addition, there are others of less common occurrence and also several so-called border-line infections in which the form of human disease closely resembles that of a corresponding animal malady, though the exact relationship may not yet be fully understood. Obviously, there is broad medical and veterinary interest in this conjoint field of science.

Because of this close relationship of the two sciences, eminent medical authorities frequently appear on the programs of our veterinary organizations, and officials engaged in live-stock-sanitation work consult with equal freedom the leaders of thought in human medicine.

VETERINARY VERSATILITY

Through wise leadership, scientific institutions and organizations representing both fields of science have performed valuable services in making special studies that indicate trends in veterinary and public health work.

A few years ago the College of Veterinary Medicine of the Ohio State University sought to adjust its course of study in order to prepare its graduates better for duties they were likely to be called upon to perform. A questionnaire was sent to the health departments of a large number of municipalities. The results when analyzed disclosed that many departments of health included veterinary divisions engaged in milk and meat inspection, also that fully 75 per cent. of the veterinarians engaged in such work conducted general food inspection. Their duties frequently extended to the inspection of the food-storage departments and kitchens of hotels, restaurants, confectioneries and other establishments engaged in preparing and dispensing human food.

Somewhat the same situation has developed in the

federal service. In connection with the inspection of meat for other branches of the government, including hospitals and institutions, veterinarians of the Bureau of Animal Industry often make supplementary examinations of various food products not of animal origin. Thus fruits, vegetables and bakery products frequently receive official inspection at the hands of veterinarians; and the procedure has proved to be satisfactory. This type of service is incidental, of course, but it illustrates the infiltration of veterinary service into public health activities and into the supervision of the public's food supply.

Possible Key to Greater Human Welfare

The versatile character of veterinary work in connection with human affairs offers many arresting reflections. We have seen how veterinary science safeguards human food. In the realm of power and labor, veterinary science contributes materially to the supply and efficiency of work stock for farms and industry, likewise to the development of equines for sport and recreation. What has been done in behalf of food, health, agriculture, industry and pleasure has also been extended to help solve other types of problems. For instance, our research on tick fever opened a new field in medical science as it was first to prove that insects carry disease. This discovery was the basis for controlling malaria, yellow fever, typhus fever, bubonic plague and many other human diseases carried by insects. At the fiftieth anniversary of the American Veterinary Medical Association, held in this city 21 years ago, I pointed out that but for this pioneer work the Panama Canal would not have been built so expeditiously.

Another new medical principle was established by the Bureau in proving that the injection of sterilized cultures or dead bacteria of a disease may confer immunity to subsequent infection with virulent organisms of that malady. This discovery was also fundamental and led to the brilliant results since obtained in controlling typhoid fever and other human diseases by bacterin therapy.

One of the most outstanding discoveries in the field of veterinary science during the last two decades was made in our Bureau laboratories. Quite surprisingly this discovery definitely disclosed the intimate relationship of the causal agent of infectious abortion of cattle to that of undulant fever of man. Subsequently this phase of the work and the scientist who initiated it were transferred to the U. S. Public Health Service.

Such contributions of veterinary science to medicine suggest the possible value of still other applications helpful to man. Just as the rabbit and guinea pig serve individually as humble test animals in medicine, so also eventually human society may discover enlightening aids for the adjustments and regulations of its own economy in the scientific and regulatory procedures pursued by the veterinary profession in administering the singularly comparable affairs of our vast animal empires.

(To be concluded)

SCIENTIFIC EVENTS

REPORT OF THE BRITISH EMPIRE CANCER CAMPAIGN

At the annual meeting of the British Empire Cancer Campaign the report, which was presented and approved, stated, according to the *Journal* of the American Medical Association, that the main attack in the battle against cancer was now being directed against the cancer cell itself. Knowledge was increasing about the cell and about the chemical reactions that occur within it in the body. Such knowledge justified a sober optimism, for the enigma of the cancer cell might be looked on as the last defense of the disease. Mr. Cecil Rowntree, surgeon to the Cancer Hospital, said that the report showed that the purposes for which the campaign were founded were being fulfilled in all directions. One purpose was the coordination of research and research organizations not only within Great Britain but throughout the empire. The recent steps of setting up a panel of international correspondents, whereby they had an accredited representative in each of the great scientific capitals, added to the accuracy and promptness of their foreign information. The investigations carried out at the Cancer Hospital and at the Middlesex Hospital suggested the possibility that the ultimate cause of cancer might be something of a chemical nature produced by disordered functions within the body itself. An admirable attempt to develop a new line of attack on cancer of the esophagus by intensive roentgen therapy had been made at St. Bartholomew's Hospital. In his Garton prize essay Dr. Colwell described the action of radiations on normal and malignant cells. All these provided encouraging indications of new and profitable avenues of research. In the direction of prevention they could point to great increase of knowledge of the nature of precancerous conditions, and in particular to the likelihood of a great diminution of the incidence of industrial cancer as the result of investigations into the carcinogenic agents in lubricating oils and other industrial materials.

On the curative side they could point to recent ad-