RECOMMENDATIONS
OF THE BUREAU OF ANIMAL INDUSTRY
ON PROBLEMS OF LIVESTOCK
PRODUCTION

PREPARED FOR THE INFORMATION OF LIVESTOCK OWNERS
AGRICULTURAL WRITERS, COUNTY AGENTS, LIVESTOCK
SPECIALISTS, THE MEAT TRADE, BUREAU EMPLOYEES
AND OTHERS INTERESTED IN THE BETTERMENT
OF THE LIVESTOCK INDUSTRY
FOREWORD

IN VIEW of the improved conditions among livestock, which the Bureau of Animal Industry of the department is seeking to bring about, it seems desirable to set forth some of its views and aims on important livestock problems. Such statements may direct attention to means of overcoming losses and increasing returns from stock growing and enable stockmen to know whether their methods are in accord with practices advised by the bureau.

There are also many official problems, especially in disease-control work, that are so closely related to livestock-production problems that a mutual understanding concerning them is desirable. Correspondence is invited from persons who have dissenting views on any of the recommendations or who wish to obtain more detailed publications or particulars concerning them.
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ON PROBLEMS OF LIVESTOCK
PRODUCTION

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CONDENSED STATEMENT OF AIMS

Stated very briefly, the Bureau of Animal Industry is working for the following results:

- A better quality of livestock.
- Improved methods of livestock feeding.
- Suppression of animal diseases and parasites.
- A higher standard of livestock sanitation.
- Reduced mortality of young animals.
- Humane treatment of livestock.
- High standard of veterinary education.
- Useful discoveries through research and experimentation.
- Information on current conditions in livestock production.
- Use of meat-inspection records in determining livestock health.
- Cooperation among the various branches of the industry.
- Enforcement of laws and regulations.
- Exclusion of foreign livestock diseases, pests, and viruses.
- Assistance to the industry through investigations and education.
- Effective supervision of public livestock markets to insure fair dealing and public confidence.

The views and recommendations of the bureau on individual problems are as follows (items arranged alphabetically):

BREEDING AND IMPROVEMENT

ALL LIVESTOCK

Breed specialization.—Community effort in raising the same breed or variety of stock offers many advantages. These include a wider selection of sires and other breeding stock, beneficial contact with breeders having similar interests, advertising value to the community, and numerous market advantages. The bureau considers that breed specialization, following careful selection, is desirable and beneficial.
Choice of breeds.—All standard breeds of livestock are meritorious and the bureau is impartial in its attitude toward them. There is less difference in the merits of average specimens of different breeds of the same type than among individuals of the same breed. In general, selection should depend on suitability of a breed for local requirements, consideration in individual cases being given to personal liking. Raising a breed that one dislikes is seldom a successful undertaking.

Crossing of breeds.—The crossing of established breeds of livestock of different types, such as beef and dairy cattle, seldom gives the results expected and is usually an undesirable practice. The crossing of longwool on fine-wool sheep, especially in the range States, is an exception to this rule. Similar types of livestock, particularly swine, when crossbred, often make excellent animals for general utility and market purposes, but their offspring have such mixed heredity that they are practically useless in systematic herd improvement. Consistent work with one well-chosen breed is more likely to give satisfaction and be profitable than attempts at crossbreeding.

Dual-purpose stock.—Most breeds and types of livestock are the result of breeding for a special purpose. Yet certain breeds and strains combine several qualities and have come to be known as dual purpose or general purpose. Breeding for two purposes, such as beef and milk, mutton and wool, or eggs and meat, is sometimes discouraged by breeding experts; yet there is evident interest in animals and fowls which bring satisfactory returns from more than one source. Dual-purpose stock can not be expected to excel in both qualities for which raised, but the bureau believes that there is a place for such stock on farms—especially in areas where increased land values demand a better utilization of available farm feed and labor and where there is a market for the dual products produced. Such stock also fits in well where the principal source of income is from some farm enterprise other than livestock and the farmer has, heretofore, given but little attention to his animals. Certainly the raising of well-bred, dual-purpose animals and fowls is to be encouraged over common mixed stock so commonly found on general farms.

Grading up.—Grading up herds and flocks by the use of purebred sires of individual merit is an economical and practical means of livestock improvement. The benefits accumulate rapidly in such respects as greater uniformity, improved quality, and increased utility value. The bureau indorses and encourages this method of improving all classes of livestock.

Inbreeding.—Inbreeding should be practiced only by the most skillful breeders and by them only when they have definite knowledge of the ancestry of their animals and are prepared for possible disappointment in the results obtained. Inbreeding for market production is an unwise procedure. Intensive inbreeding brings to light hidden characteristics and quickly leads to a fixation of type. There is ever present, however, the possibility that poor rather than good characteristics will be brought to light and fixed, thus resulting in rapid degeneration of the stock.

New breeds.—The establishment of new breeds of livestock involves years of the most skillful effort as well as extensive resources.
RECOMMENDATIONS ON LIVESTOCK PRODUCTION

in funds and in large numbers of specially selected breeding animals. Moreover, the results are uncertain and so often disappointing that the bureau cautions the average livestock owner against the attempt. The development of new breeds is best left to experimentalists. Persons inclined toward breeding activities along original lines can render more valuable service to the industry by developing improved types of the established breeds.

**Pure breeding.**—The breeding of purebred livestock is a fascinating and inspiring branch of the industry. Success depends to a large extent on one's ability as a judge of livestock and knowledge of breeding principles and of the pedigrees for the breeding stock available for use. Standards in pure breeding are exacting, and the undertaking requires a high degree of business ability in the successful advertising and sale of surplus stock. Inexperienced breeders of purebred stock are advised to make a small beginning and build on it gradually rather than to make a large initial investment.

CARE AND MANAGEMENT OF LIVESTOCK

**ALL LIVESTOCK**

**Better feeding.**—An important means of reducing costs and increasing net returns from livestock is more skillful feeding. This question involves a practical knowledge of feeding requirements of different classes of animals, composition of feeds, and the compounding of rations. The better feeding of livestock is a study that pays well for the time devoted to it, and the bureau extends its assistance to interested persons.

**Disposal of dead animals.**—The complete destruction or sanitary disposal of animals that die of disease or from unknown causes is strongly urged as a means of controlling diseases. Incineration is the preferred method, but when this can not be done, deep burial is a second choice. Additional precautions are necessary in dealing with certain diseases. Leaving dead animals on the surface of the ground or feeding them to other livestock is a menace to healthy stock and to the general welfare.

**Humane treatment of animals.**—The bureau asks the cooperation of all persons who handle livestock, or who influence public opinion in improving the comfort of animals and reducing suffering. Humane treatment involves not only absence of cruelty but prompt and skillful attention to disease and injuries, prevention of needless exposure, and humane methods of slaughter. The brutal use of clubs and whips in handling animals not only causes serious economic losses but is unworthy of the high standing which the best element among stockmen seeks to attain for the industry.

**Mortality of young animals.**—Death losses of young animals from exposure, accident, and preventable causes are needlessly high. The actual value of a young animal, when all items in its production are considered, is commonly underestimated. The bureau urges all reasonable efforts to reduce such mortality. Guardrails in farrowing pens, creeps for feeding young and weak animals, suitable maternity stalls, and restraint or separation of animals that injure others are suggested means. Sanitation is highly important, and so far as feasible, young animals should be kept away from older ones and
from areas previously occupied by older ones. Young animals require special attention just as babies do.

**Runty livestock.**—Runtness in farm livestock is largely preventable by better breeding, proper feeding, control of diseases and parasites, and proper housing and attention. Weaning time is a critical period and farm animals should receive especially good feed and care then to prevent interruption to growth.

**Sanitation.**—Maintaining a high standard of cleanliness on livestock farms aids in preventing losses and making the farm atmosphere wholesome. Sanitation involves good drainage, prompt disposal of manure, good light and ventilation in buildings, and keeping the premises in a condition that is unfavorable for the existence or multiplication of disease-producing parasites or other pests. A much higher standard of sanitation is one of the most pressing needs of the livestock industry.

**Shelter and equipment.**—Proper shelter for livestock and feedstuffs has a very decided effect upon the returns of the livestock industry. Buildings should be designed for the particular purpose for which they are to be used. They should provide the surroundings best suited to the welfare of the stock or preservation of feedstuffs. The arrangement and equipment should be such as to utilize space to the best advantage and to minimize the labor required in handling and caring for the stock. The cost of shelter must be in proper proportion to other items of production costs but cheap construction, attained through omission of essentials, is often the more costly.

**CATTLE**

**Castrating and dehorning cattle.**—The bureau advises the castrating and dehorning of market cattle. Castrating calves improves their feeding quality and also increases the value of the carcasses. The operation is performed most safely when the calves are from a few weeks up to 8 months old. Dehorning makes cattle easier to handle, prevents injuries in feed lots and in transit to market, and adds to uniformity of appearance.

**Silos and silage.**—Silos are a valuable means of providing economical and succulent feed during winter and at times when pastures are inadequate. It is important to select a size and type of silo suited to the number and kind of livestock kept. Durability and tight construction, which prevents spoiling of contents, should receive special consideration. Though corn silage is by far the most common kind, other crops produce good silage and are deserving of study, especially in localities that do not produce corn. Careful attention to the stage of maturity of the crop at harvest time and other means of obtaining a good quality of silage are advised.

**SHEEP**

**Castrating and docking lambs.**—The market quality and appearance of lambs are improved by castration and docking. For convenience these operations may be performed at the same time. The most suitable time is when the lambs are from 7 to 10 days old.

**Flushing of ewes.**—Extra feeding of ewes at breeding time—a practice known as flushing—has materially increased the lamb yield in experimental studies. Increases due to the practice have ranged
from about 15 to 25 lambs per 100 ewes above the usual lamb yield. This method of increasing the lamb crop from a flock offers promising possibilities to sheep owners.

SWINE

Castration of pigs.—Pigs raised for market should be castrated while young, preferably between 6 and 8 weeks of age, before weaning. This operation improves the quality of meat and is otherwise desirable. Sanitary precautions should be observed.

POULTRY

Culling.—Poultrymen should cull their flocks during August, September, and October, during which time the poor layers in the flock may be detected by the color of combs and legs, and the condition of molt, as well as by other characters which have been found to be associated with egg production.

Hatch early.—Success in keeping poultry for egg production depends largely on a good yield of eggs late in the fall and in winter. To obtain this result it is necessary to hatch chickens early in the spring so that they will begin to lay when the hens are molting. The preferred hatching period is during March and April, but the period chosen naturally depends on the breed, climate, and facilities for giving the chicks proper care.

Preserving eggs.—Preserving eggs for home use is an economical and commendable enterprise as a means of equalizing production of eggs and home requirements. Water glass and lime solutions are both satisfactory for the purpose. Eggs should have sound shells and be perfectly fresh when placed in the preserving solution. It is advisable to obtain dependable directions and follow them closely.

Produce infertile eggs.—The production of infertile eggs for market is strongly advised. Such eggs keep much better than fertile eggs, especially in hot weather. The removal of male birds from the poultry flock when the hatching season is over is therefore recommended. The absence of males makes no difference in the egg production of the flock.

Trap nesting.—The trap nesting of a poultry flock is an accurate means of ascertaining egg production of individual hens and is valuable as a basis for poultry-breeding work. The considerable labor involved makes trap nesting impractical in the improvement of the average farm flock.

CONTROL OF DISEASES AND PARASITES

DISEASES

Anthrax.—Anthrax is an acute, infectious disease affecting cattle principally but also other animals and occasionally man. In the most common form, local, external swellings or tumors occur and death follows within a few days. The most effective method of dealing with anthrax is prevention. This includes (1) vaccination of all exposed animals or animals in herds threatened with exposure, and (2) burning the carcasses of animals that have died of the disease. Vaccine for immunizing animals against anthrax should be used only by qualified veterinarians. The decision to guard against anthrax
by vaccination depends on the extent of local losses and other indications of probable danger.

**Blackleg.**—Blackleg is a rapidly fatal, infectious disease confined to areas where the soil is infected with the blackleg organism. The age of greatest danger is between 6 months and 2 years, and it is very unusual that cattle older than 3 years are affected. Prevention consists in treating susceptible cattle with blackleg vaccine, filtrate, or aggressine. Medical treatment is ineffective. Carcasses of animals which have died of blackleg should be completely burned or deeply buried to prevent reinfection of premises.

**Bloating.**—Losses due to bloating of livestock—usually cattle and sheep—are preventable by proper management. Bloating is most commonly caused by turning hungry stock on to succulent pasture, such as clover or alfalfa. If the pasture is moist from rain, dew, or frost, the danger is greater. Prevention lies in giving the animals a liberal feed of hay before admitting them to the pasture. Restricting the length of grazing time is another means. In serious cases the use of a trocar, by a qualified veterinarian, for puncturing the paunch to remove the gas is advisable to prevent suffocation.

**Fictitious diseases.**—Belief still persists in fictitious and imaginary diseases such as "hollow horn," "wolf in the tail," "loss of cud," and many others, treatments for which are often cruel. The bureau commends all efforts to dispel superstitious beliefs of that sort and is ready to furnish accurate information on actual diseases affecting domestic animals.

**Foot-and-mouth disease.**—Foot-and-mouth disease, which affects principally cattle, swine, sheep, and goats, causes such serious ravages and such heavy losses abroad that it must never be permitted to become established in the United States. Because of the possibility of its introduction from some foreign country, cooperation of stockmen in promptly reporting suspicious symptoms among their animals is highly important. Prompt slaughter and burial of affected animals, rigid quarantine measures, thorough disinfection, and payment of fair indemnity have proved to be effective means of eradication. The commission appointed by the department for the study of foot-and-mouth disease in Europe recommends the slaughter method as the most efficient and economical way of handling the disease in the United States. It recommends also that until science furnishes new methods of control, any future outbreaks of the disease should be combated by the slaughter or stamping-out method. The bureau's policy of dealing with foot-and-mouth disease is in accord with the commission's recommendations.

**Foreign livestock diseases.**—Foreign livestock diseases, such as contagious pleuro pneumonia, rinderpest, surra, African horse sickness, and foot-and-mouth disease, are excluded from the United States by rigid regulations applicable to livestock, animal by-products, feeding materials, etc., from foreign countries, and by denying entry to this country of biological products which may be conveyers of infection. Should any foreign disease gain access to the United States, the bureau will issue prompt warning and take the necessary steps to eradicate it. As in the case of foot-and-mouth disease, which is the best-known foreign livestock plague, public cooperation is necessary for the most economical and effective results.
Hemorrhagic septicemia.—Hemorrhagic septicemia, also called shipping fever, is a germ disease occurring largely among animals—principally cattle—that undergo the hardships of travel in the fall and winter months. To prevent losses it is important that the vitality of the stock be maintained by careful handling and regular feeding and watering. The following precautions are especially advised: Avoid hard driving; allow ample time for cattle to rest before loading; avoid overcrowding in cars; and see that cars are well bedded. The practice of withholding feed and water so that the animals will take a heavy fill tends to upset the digestive system and is harmful. Good care during shipment is especially important in the case of feeder cattle. The use of bacterins and aggressin to establish immunity is generally successful when these products are used at least 10 days before the animals are shipped. Antihemorrhagic-septicemia serum has considerable value as a curative agent in the early stages of the disease, but prevention is better.

Hog cholera.—Hog cholera is readily prevented and controlled by immunizing susceptible animals with anti-hog-cholera serum, either alone or in combination with hog-cholera virus. The latter method is usually preferable, since it gives a "solid" or lasting immunity. Treatment is most economical when applied to hogs while they are young and should be administered by a competent veterinarian, or, in sections where such service is not available, by a carefully trained layman. Being a preventive and not a cure, the treatment should be applied before infection threatens the herd, preferably before the pigs are weaned or soon afterwards. At that size they require less serum and are more easily handled than large hogs. It is advisable, without fail, to protect garbage-fed hogs and valuable breeding stock by proper immunization. In localities where hog cholera is more or less prevalent each year, swine herds should be kept immunized. Where no hog cholera is known to exist, the immunizing treatment is not called for, but diligent care should be used in watching and guarding the hogs against carriers of infection. Though sanitation, quarantine, and other safeguards are helpful in preventing hog-cholera losses, immunization is the most dependable and positive method of preventing hog-cholera losses and of checking outbreaks of the disease.

Clear anti-hog-cholera serum, heated in the course of preparation, is the best type of serum for preventing the ravages of hog cholera and the attending financial losses. Clear serum is more quickly absorbed than defibrinated blood serum; therefore, the clear product is preferable in most circumstances. Owing to more rapid absorption it may be reasonably expected to protect a larger proportion of hogs in sick herds. Heating or pasteurization of the product as carried out under the supervision of bureau employees destroys disease-producing bacteria, should they be present, and the product as marketed is frequently free from all bacteria. Its keeping qualities, therefore, are better than are those of defibrinated blood serum or unheated clear serum and it will not produce abscesses. Dosage tables found on all trade labels of serum show the minimum doses which the bureau permits producers to recommend. Serum always should be administered in ample doses, but in sick herds or those in
poor condition the dose for each animal should be increased as conditions in the herd may indicate.

**Infectious abortion.**—The eradication or control of this disease is rendered difficult because of the large number of animals that appear to be healthy but nevertheless carry the germs of the disease in their udders. An animal of this kind may spread the germs in large numbers at an unexpected abortion or apparently normal parturition. An infected cow that has ceased to abort or even one that has never aborted may be a dangerous carrier of the germs. Infected cows can usually be detected by means of the agglutination (blood) test. Their elimination or segregation, by removing sources of infection, often stops the spread of the disease in herds and makes its complete eradication possible. Keeping susceptible animals, especially when pregnant, from coming into contact with infection is also helpful in the control of the disease. The use of maternity stalls in which all pregnancies are terminated plays an important part in keeping infection confined until it can be destroyed. Building abortion-free herds from infected ones, by keeping the calves away from infected animals and environments after they are 6 months of age, offers much promise because calves up to that age rarely contract the disease. So far as practicable, herds should be developed and maintained by their own progeny, but if animals must be purchased they should come from herds in which the disease does not exist. In purchasing stock from questionable sources, much safety is afforded by selecting only young, unbred animals, holding them in isolation for a brief period and subjecting them to two agglutination tests with an interval of two months between the tests.

**Milk fever.**—Milk fever usually attacks the best milking cows in the herd. Treatment consists in the injection of sterile atmospheric air, or oxygen, into the udder, thereby distending it and correcting the paralysis caused by the disease. Because of the importance of promptness in treating milk fever, dairymen should equip themselves with a suitable outfit for the purpose, in localities where the services of a veterinarian can not be procured quickly. Sanitary precautions should be strictly observed in treating the disease.

**Poisoning by plants.**—In reducing livestock losses caused by poisonous plants, proper identification of the plants responsible for the trouble is of prime importance. The use of department literature should be helpful in this respect. After positive identification, the proper means of prevention naturally follows. The bureau has conducted numerous investigations on stock-poisoning plants and the results are available to the public. In the light of present information on the subject, most of the losses caused by poisonous plants are preventable.

**Poultry diseases.**—Owing to the smaller value of fowls compared with other farm animals, poultry losses from disease or unknown causes have not received much consideration on average farms. Poultry diseases, like others, are preventable or controllable. Attention to sanitation, frequent and proper use of disinfectants, and an accurate knowledge of procedure for combating a given trouble are important means of reducing losses. The bureau offers its assistance to poultry raisers in this field.
**Rabies.**—Rabies is an infectious disease involving the central nervous system and is most common in dogs, though cattle and other animals are susceptible. So many incorrect beliefs exist concerning this disease that the study of Farmers' Bulletin 449 on the subject, or of other dependable information, is strongly advised. Control measures found to be most effective are the destruction of vagrant dogs, quarantine measures, the muzzling of dogs or confining them to home premises, general licensing, and immunization when the disease is a definite menace on account of wide prevalence.

**Sheep scab.**—Sheep scab is a contagious skin disease caused by a mite which reduces the weight of sheep, brings about unthriftness, and may cause death. The bureau has been active in eradicating the disease by causing sheep to be dipped in a medicated solution. Two dippings from 10 to 14 days apart are usually necessary to effect a cure. The bureau urges constant efforts to reduce the ravages of this injurious disease.

**Tick fever.**—Cattle-fever ticks are the carriers of tick-fever infection and cause other heavy losses due to the bloodsucking habits of the pest. Ticks can be eradicated by systematic dipping under proper supervision. Tick eradication in the United States is about four-fifths completed, and the bureau desires the support of all interested persons in finishing the task promptly and economically. Meanwhile the continuous quarantine of ticky areas is necessary for the protection of the cattle industry in other parts of the country.

**Tuberculosis.**—The eradication of tuberculosis from livestock in the United States is a practicable though huge undertaking. The work is important from an economic standpoint and also as a public-health measure, since human beings, especially children, may be infected by using dairy products from tuberculous animals. Very satisfactory progress has been made in the last 12 years through the cooperative efforts of the Federal, State, and local officials. The area plan continues to be the most effective and economical in combating tuberculosis in livestock. The accredited-herd plan is also effective and serves as an excellent foundation for area work. In some sections of the country a large percentage of the poultry flocks are affected with tuberculosis. Some progress is being made in the control of the disease in farm fowls. Swine are susceptible to both avian and bovine tuberculosis. The eradication of the disease from cattle and poultry, therefore, tends greatly to reduce tuberculosis in swine. Livestock owners are urged to follow the procedure outlined in the farmers' bulletins on bovine, swine, and fowl tuberculosis for eradicating the disease from their premises.

**Parasites**

**Parasites, internal, of cattle, sheep, and goats.**—The control of internal parasites of ruminants involves periodic treatment with suitable anthelmintics for the removal of parasites and rotation of stock and pastures so far as available pastures permit. The bureau recommends systematic treatment of cattle, sheep, and goats for the control of stomach worms, tapeworms, and other injurious internal

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1 For additional information, especially concerning the times of the year when the parasites mentioned and others are best controlled, consult Miscellaneous Publication No. 25, "A Calendar of Livestock Parasites."
parasites which infest these animals. The control of sheep liver flukes involves dusting or spraying of pastures with copper sulphate to destroy snails which transmit the parasites, the draining of marshy pastures, the fencing off or filling in of wet areas, and the treatment of infested sheep for the removal of flukes from the bile ducts.

**Parasites, internal, of dogs.**—The parasites of dogs and related carnivorous animals are recognized as being of considerable importance from the standpoint of the livestock industry and public health. The dog is a useful farm animal and faithful companion, but if permitted to harbor parasites it may become a serious menace. Several tapeworms of dogs pass their larval stage in cattle, sheep, goats, and swine, and the condemnation of carcasses and parts under meat-inspection procedure constitutes a considerable loss. The hydatid, the larval stage of one species of dog tapeworm, may infest man, sometimes with fatal results. A very annoying skin affection of man, known as creeping eruption, is caused by the larvae of one of the dog and cat hookworms. Satisfactory treatments have been developed for many of these parasites and the bureau recommends that all infested dogs be treated.

**Parasites, internal, of horses.**—The control of internal parasites of horses, some of which are very injurious and may cause death, involves systematic treatment for the removal of parasites and sanitation measures on pastures and in stables to prevent excessive infestation. The bureau recommends that owners who suspect the presence of internal horse parasites have their horses treated by a competent veterinarian. The usual results of the treatment are gain in weight and increased efficiency. Pasture rotation and sanitary management of stables and yards also help to cut down losses among foals, promote growth, and produce hardy stock.

**Parasites of poultry.**—Losses from parasites have become a more important factor in poultry raising as the poultry industry has developed in recent years. As control measures, the bureau recommends sanitation, and, whenever necessary, routine treatment for worms. Based on definite knowledge of the life histories of roundworms and tapeworms certain items of sanitation can be emphasized. Particularly important is the prompt disposal of droppings with their parasitic content in such a way as to destroy the parasites. Damp areas about feed and water containers should not be allowed. All manure, boards, boxes, and other things that afford food, shelter, or breeding places for flies, beetles, slugs, and other small animals that act as intermediate hosts for various worms should be cleaned up and further accumulation prevented. Rotation of yards is of value, particularly for those parasites that develop without an intermediate host. Cleanliness is of the utmost importance in the control of coccidiosis. Treatment of birds with nicotine sulphate or with tetrachlorethylene for ascarids in the small intestine and with kamala for tapeworms is recommended. Nicotine sulphate on roosts and sodium fluoride applied to the birds may be used to control lice, and carbolineum sprayed on walls, roosts, and boxes may be used to control mites and ticks or "blue bugs."

**Parasites, internal, of swine.**—The common ascarid of swine, though one of the most injurious livestock parasites, is readily controlled by a system of sanitation, now widely used. It involves
farrowing in clean pens and raising the pigs on clean pastures at a distance from permanent hogpens and yards until the pigs are about 4 months old. At that age they are able to resist serious infection. Other injurious parasites of swine, such as kidney worms, nodular worms, and the red stomach worm, may be controlled to some extent by this system of sanitation; a more thorough control of these parasites involves additional precautions in the way of cleanliness, elimination of wallows, and other sanitary procedures. The control of lungworms, which are transmitted by earthworms, and of thorn-headed worms, which are transmitted by white grubs, involves the application of devices to prevent rooting, as these parasites are acquired by hogs as a result of eating the intermediate hosts while rooting, and the disposal of manure in such a way that earthworms and insects can not become infected with the parasite eggs and larvae in the manure.

Sheep tick.—The sheep tick is a bloodsucking parasite which infects sheep on both farms and ranges. The only practicable way to destroy the pest is by dipping the sheep in a suitable medicated solution. Two dippings about 24 days apart are necessary. Continued vigilance and dippings when ticks are numerous will keep this pest under control.

GENERAL INFORMATION

RESEARCH AND EDUCATION

Animal husbandry.—The study of animal husbandry, including the breeding, feeding, care, judging, and management of domestic animals, is commended to persons interested in livestock. Such a knowledge is useful in practical farming, veterinary practice, teaching of agriculture, and in similar activities. A knowledge of animal husbandry is fundamental in all livestock work. It is best studied in an agricultural college, but there are also excellent books and bulletins on the subject.

Exhibits.—The bureau recognizes the value of educational exhibits and encourages their preparation. Attractiveness, directness of statement, and freedom from confusing details are advised in this connection. Special care should be taken by bureau employees in the use of pathological specimens for exhibit purposes. Material that is interesting to veterinarians and scientists is often repulsive to laymen; and for lay audiences little is gained by displaying specimens containing abscesses, inflamed conditions, or bloodstained areas. Though some material of this sort may be suitable for scientific meetings, it is generally advisable to refrain from using such classes of pathological specimens.

Experiment farms.—In the belief that livestock problems can be best solved under the conditions where they exist, experiment farms are operated in various parts of the country. The work includes many lines of investigation and also the testing out, under farm conditions, of the results of research.

Literary activities.—Writings on livestock subjects are capable of great influence in forming public opinion and in extending useful information. Care and accuracy in the preparation of such material are therefore urged, and adherence to the recognized rules of rhet-
ropic and composition is advised so that the quality of writing will be on a high plane and will command respect from all sources. Accuracy in the use of breed names, technical terms, and statistical information is especially important.

Public information.—Well-prepared press articles, bulletins, motion pictures, and exhibits dealing with livestock problems have a high educational value. The bureau participates in and heartily encourages these activities. It invites the visits of journalists and renders them assistance in the preparation of constructive articles.

Research.—Research by qualified investigators is considered the most satisfactory way to solve many classes of livestock problems. Such research already has solved many baffling problems and reduced heavy losses. It is obviously desirable that research should be carefully planned, conducted to completion in an expert manner, and the results promptly made public. In view of the substantial benefit which the livestock industry has derived from research and experimentation, the bureau looks with favor on liberal appropriations for such work, including studies in cooperation with State agricultural experiment stations and other research organizations. Funds for the type of research described are practically certain to be a profitable investment from a public standpoint. Even a minor discovery has far-reaching benefits when applied to the millions of livestock in the United States.

Veterinary education.—An adequate number of well-trained veterinarians is essential for the well-being and protection of the livestock industry and for the efficient conduct of Federal meat inspection and various other official services. The bureau has cooperated with veterinary colleges in bringing about high standards of education in this field and in making the veterinary profession one of dignity and public respect. This profession is commended to young men who have the inclination and necessary qualifications.

REGULATION, COOPERATION, AND MISCELLANEOUS TOPICS

Compliance with livestock laws.—Most livestock laws which come within the scope of the Bureau of Animal Industry’s work are intended to prevent the spread of disease, losses, or suffering of animals, and to bring about improvement in livestock conditions in various ways. Persons unfamiliar with such laws should inform themselves, thereby avoiding the possibility of prosecution for violations. The laws are strictly enforced.

Cooperation.—Friction and efforts which oppose one another are a costly waste of energy. Cooperation in attaining greater efficiency in livestock production and in removing undesirable conditions is therefore encouraged. Such matters as breed jealousies, traffic in diseased stock, selfish indifference to the rights and welfare of others—as, for instance, violation of quarantine regulations—are out of harmony with true cooperation.

Future of livestock industry.—The bureau is optimistic concerning the future of the livestock industry. Statistics indicate that livestock will not increase in numbers so fast as the human population. As land becomes more valuable and human population increases, dairy or dual-purpose cattle probably will replace beef cattle in some degree, especially near cities. Better livestock of all
kinds must replace inefficient, inferior kinds if stock owners are to prosper. Problems of the industry probably will increase in number because of a higher complexity of national life brought about by increased population. * The successful solution of present problems will aid greatly in meeting problems of the future.

Judging livestock.—The judging of livestock by competent authorities at fairs, shows, and other exhibitions is an important means of bringing about high standards of excellence in breeding stock and market types. The bureau encourages also such related activities as students’ judging contests and other means of training persons to judge accurately the merits of animals. It looks with disfavor, however, on the granting of prizes to breeding animals that are diseased, overfat, or otherwise unsuited for breeding, or that convey to the public a false idea of qualities that good breeding stock should possess. The bureau considers that the practice of “plugging” show animals (filling up depressions by injections of tallow, lard, oils, or other substances) is deceptive and detrimental to the best interests of livestock breeding. The bureau recommends the disqualification of animals so treated, together with such publicity, penalties, and other deterrent action as will free livestock shows from this abuse.

Livestock scales.—Experience has shown that when livestock scales do not receive regular and competent inspection and testing, errors are common. Farm scales should be inspected by the owner at least four times a year. The levers should be horizontal and the connections between them should be plumb. The scale pit should be kept clean. All “binds” in the platform and live parts of the scale should be eliminated. Often errors are introduced by a derangement of the scale parts beneath the platform or from mechanical interference which can be observed and recognized by careful examination of the scale by the owner. Some States provide scale-testing equipment. It is highly important also to test the scales, at least annually, to the capacity at which they are used. This work should be done by men with the proper training. The bureau is endeavoring to bring about improved conditions in farm scales by cooperating with State officials and others interested. The bureau also supervises scales and weighing at stockyards subject to the packers and stockyards act. Producers should feel free to consult the bureau’s supervisors at such markets with respect to weighing and other market services.

Meat consumption.—The study of human-food requirements and the preparation of well-balanced meals should receive attention in every home as a means of overcoming misinformation and ascertaining the true merits of all foods. Since meats are wholesome, nutritious, and palatable, prejudiced attacks and misrepresentation sometimes directed against them are unwarranted. The bureau urges the thorough study of meat, including the selection of the various cuts and methods of preparation.

Meat inspection.—The results of a quarter century of experience in the Federal inspection of meat have demonstrated the value of a suitable inspection service as a safeguard to the public, as a means of fostering export trade, and as a source of information to farmers concerning the health of their stock. The jurisdiction of the
Federal meat-inspection service refers particularly to interstate and foreign commerce, but the bureau recommends State and municipal meat inspection, with Federal requirements as a basis.

**Sheep-killing dogs.**—Heavy losses to flock owners caused directly and indirectly by sheep-killing dogs have tended to discourage sheep raising in localities where such depredations have occurred. The bureau commends legislation and other means of stopping losses and of giving sheep owners suitable redress against owners of sheep-killing dogs.

**Statistics.**—Accurate statistical information is an important basis for planning livestock operations wisely and for verifying or correcting one's judgment of conditions bearing on the industry. A wider study of statistics by livestock owners should be beneficial to their interests and to public welfare.