DEATH losses from all causes in 1954 included more than 1.5 million cattle, 2.5 million calves, 4 million sheep and lambs, and 10.5 million hogs and pigs.

About 2.5 million turkeys died from diseases and other causes that year.

About 235 million chickens and 7.2 million turkeys died from diseases and other causes that year.

About 250,000 horses and mules and an unknown number of goats, and fur animals, domestic rabbits, and miscellaneous poultry also were lost.

The figures do not measure the full toll of animal diseases: The loss in production, feed, labor, and capital investment is tremendous every year.

Nor do official figures include the deaths of baby pigs and lambs, because estimates of losses relate only to those considered "saved," or raised to about weaning age. Another 30 million pigs and perhaps as many as 3.5 million lambs may have died before weaning. Occasional investigations have indicated losses of baby pigs at 20 to 35 percent of the number born and losses of baby lambs from all causes at 15 percent.

A few surveys have been made to obtain information on the importance of disease and parasites as a cause of death. A Minnesota survey disclosed about 58 percent of the deaths of turkeys in 1951 resulted from disease and parasites.

Earlier surveys in Missouri and Wisconsin showed the disease toll ranging from 27 to 80 percent of the deaths of various species of livestock and poultry. The surveys indicated that about 55 percent of the deaths resulted from disease.

The value of livestock and poultry that were lost in 1954 from all causes, roughly calculated, was more than 1 billion dollars. Death loss from diseases and parasites alone may have exceeded 500 million dollars.

Farmers are most keenly aware of the economic loss from livestock and poultry that die or suffer from illness severe enough to cut production rates or increase the costs of production. They are well aware of the expense of curing the sick animals or protecting animals against disease but less aware of the lower efficiency of production and lower quality of their products as a result of disease and parasites.

Economic loss is not confined strictly to farm operations, although losses discovered after livestock and poultry leave the farm have a way of being reflected in prices received by farmers. Sick animals create losses when they are transported from farm to market and handled at the markets and in packing and processing plants.

Hidden losses from disease and parasites in meat, hides, edible offal, and byproducts because of condemnations or lowered quality, when added to the economic loss from death and sickness on the farm and between the farm and the processor, reach a staggering total.

The best judgment of specialists in the Department of Agriculture on the extent of livestock and poultry losses was reported in Losses in Agriculture, a Preliminary Appraisal for Review, issued in June 1954. Annual losses of livestock and poultry from diseases, disorders, parasites, and insect pests for the period 1942-1951 were placed in that report at 2,420 million dollars.

The losses represented about 6 percent of the potential agricultural production and about 15 percent of the average annual value of farm marketings and home consumption of livestock and products. The publication
pointed out that the potential return from nearly 20 million acres of crop-
land and 126 million acres of grassland was lost because of animal diseases, dis-
orders, insect pests, and internal para-
sites and the downgrading of livestock products because of lowered quality.

Costs of controlling, combating, and preventing diseases may be charged to
disease and parasites; so also a large part of the cost of protecting the public
from unwholesome meat products.

Protective measures even extend be-
yond the boundaries of the United
States—the campaign against foot-
and-mouth disease in Mexico after
1947 cost 134.5 million dollars net. Inspec-
tion of exports and imports of live animals cost 850 thousand dollars in 1954. The fight against vesicular exanthema disease in hogs involved
nearly 4 million dollars in State and
Federal indemnity payments to pro-
ducers. One item of expense—as an
example—was the visits inspectors had
to make once a month to 14,000
premises to check a million hogs that
were fed garbage, that being a cause
of vesicular exanthema.

Besides the expenditures for foot-
and-mouth disease and vesicular ex-
anthema, Federal appropriations for
the eradication of animal diseases
amounted to 7.2 million dollars in
1954. In addition, State agencies spent
approximately 23 millions of dollars;
that sum included 5.7 million dollars
spent to combat tuberculosis and 13.6
million dollars to fight brucellosis.

Deaths and sickness resulting from
cattle diseases, including nutritional
ailments, have inflicted losses in excess
of 650 million dollars a year. Special-
ists judged the loss to cattle and calves
at more than 400 million dollars and
the loss in value of milk production at
nearly 250 million dollars.

The value of the cattle that died
from disease was believed to be around
90 million dollars. Bloat, leptospirosis,
and mastitis were responsible for
about four-fifths of the deaths of cattle.

Mastitis was responsible also for an
additional production loss valued at
225 million dollars. Vibriosis cost
nearly 140 million dollars; leptospiro-
sis, more than 100 million dollars; and
brucellosis, about 100 million dollars,
including a control cost of about 14
million dollars. In addition, brucellosis causes sterility which, if included,
would increase the dollar loss about 50
percent.

About 80 percent of all the live-
stock slaughtered commercially in the
United States are processed in plants
operating under Federal meat inspec-
tion. The animals receive careful
inspection at the plants before and at
the time of slaughter. Often the meat
inspectors can identify the diseased
animals so that they can be traced to
their origin. Thus information is had
concerning the centers of infection.

Meat inspection records show the
incidence of all the disease conditions
found by inspectors on ante-mortem
and post-mortem inspection. The rec-
ords are retained for several years and
can be used to determine incidence
and trends of diseases.

Inspectors of Federal Meat Inspec-
tion condemned about 120,000 car-
casses of cattle and calves in 1954.
Most of the animals were condemned
because of diseased, parasitic, or septic
conditions. About 330,000 parts of
carcasses and 2,400,000 cattle and calf
livers were condemned. Cattle livers
from approximately 13 percent of the
cattle slaughtered under Federal inspec-
tion were condemned as unfit for
food for people.

Annual losses from swine diseases,
including losses of baby pigs, were
believed to exceed 500 million dollars
at least. The greater part of this
dollar loss is represented by losses of
baby pigs, which result from infections
and parasites and from mismanage-
ment and nutritional disorders.

A reduction in losses of baby pigs in
the future would contribute greatly to
increased productivity in hog produc-
tion and lower cost of production per
breeding unit. An average of nearly 7
pigs is saved per litter up to weaning age. The average could be close to 10 pigs if the causes contributing to pig losses were eliminated.

Losses from hog cholera cost nearly 50 million dollars a year, despite widespread use of preventive measures. Erysipelas causes losses in production valued at 24 million dollars annually, and atrophic rhinitis (sneezing sickness) at 14 million dollars. Brucellosis cuts hog income by an average of 10 million dollars each year.

Federal meat inspectors condemned 99,000 swine for 50 different causes in 1954. Arthritis, septic conditions such as abscess, and pleurisy or pneumonia accounted for half of the condemnations.

Parts of more than 1.6 million swine carcasses were condemned in 1954. Most of the rejections were due to abscess or pyemia conditions.

Sheep diseases reduced the value of annual production around 12 million dollars in 1942-1951. Vibriosis, with resulting abortion and loss in weight and wool, accounted for more than 70 percent of the annual loss.

About 65,000 sheep and lambs were condemned in 1954.

Diseases inflict losses to horses, mules, goats, fur animals, and rabbits amounting to about another 5 million dollars.

A heavy loss in value results from poultry diseases. This loss is reflected in mortality, lower egg production and fertility, and inefficient use of feed. Newcastle disease and pullorum disease, once serious threats to the poultry industry, have been brought under control, but the annual loss from disease probably exceeds 240 million dollars. Lymphomatosis causes the heaviest loss, accounting for more than one-fourth of the total.

About 300 kinds of internal parasites are of economic importance. Some are common and abundant. Others are rare. Internal parasites cut into livestock and poultry production by more than 400 million dollars annually. That is a rough estimate, but probably it is low, because it does not include many hidden losses. It is difficult or impossible to arrive at an accurate evaluation of the economic loss from internal parasites, which affect production and quality of animal and poultry products and involve waste of feed, labor and equipment, and cost of control, treatment, and eradication.

Internal parasites hit swine hardest of all species; the losses are put at more than 275 million dollars annually. Worms of various kinds caused more than 70 percent of the swine losses from internal parasites. Losses from kidney worms were especially serious.

Internal parasites reduced cattle and sheep production by an annual loss valued at nearly 40 million dollars each, and poultry by more than 45 million dollars.

Insect pests take another big chunk out of potential livestock and poultry income; that loss is set at more than 500 million dollars a year. Economic losses show up in damage to hides and meat, loss in weight and milk production, inefficient utilization of feed, and damage to wool and mohair. Labor and other resources also are expended to combat the pests. Hornflies reduce the potential value of cattle and milk production by an estimated 150 million dollars a year. Damage by cattle grubs to hides, loss in carcass meat, and productivity are believed to reach 100 million dollars annually. Insect damage to sheep may be 20 million dollars a year and to poultry 80 million dollars.

Effective control and eradication of livestock diseases, parasites, and insect pests would contribute to greater productivity of the land resources of the United States. The potential return from millions of acres of cropland and grassland represented by the economic tolls from livestock disease and parasites is a significant part of the national agricultural output. It represents a huge economic loss and waste of agricultural resources each year. The reduction of this loss should be a
major objective of research to improve efficiency of agricultural production and increase returns to producers.

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Infectious Diseases Common to Animals and Man

James H. Steele

Zoonoses are diseases that are transmitted among animals and from animals to man.

Of more than 200 communicable diseases of animals, one-half are considered infectious to man, and more than 80 are transmitted naturally between vertebrate animals and man.

They are grouped according to their morphological characteristics—that is, viral, rickettsial, bacterial, fungal, protozoal, helminthic, and arthropod-insect.

Many other parasitic diseases of animals have occurred only rarely or on single occasions. Of the 120 parasites found both in animals and man, 76 are rare in man. Some of the latter may occur more commonly than is supposed, but others must be thought of as accidental infections.

Animals also are passive carriers of disease organisms, the most common of which are the bacilli of tetanus, gas gangrene, and botulism. Animals also transmit toxins, or chemicals, which may be injurious to persons who eat the meat.

Wild animals and birds are important reservoirs of zoonoses. They may be of even greater concern than domestic animals in some countries. Among them are wild dogs, wildcats, and rodents.

Rabies is the most serious disease that can be attributed to the dog. The dog, as far as man is concerned, is the major reservoir of rabies. Each year in the United States more than 600,000 persons are bitten by dogs; 5 to 10 percent of the victims have to have antirabies vaccine because the biting animal is proved rabid or is suspected of being rabid. Even if the dog is not captured or if for some other reason laboratory examination is not possible immediately, the victim must be given the vaccine.

The cost of rabies in our country exceeds 10 million dollars a year.

In the Western Hemisphere, rabies is a problem in the United States and in Alaska, parts of Canada, Mexico, Central America, and most of South America. The only places free of rabies are eastern Canada, the Northeastern States, some localities in the Northwestern States, some parts of the West Indies, Panama, southern Chile, and Argentina. The elimination of canine rabies in the Americas would save millions of dollars. The same probably can be said for the parts of Europe, Africa, and Asia where canine rabies