

# FEEDING DOGS

by S. R. Speelman <sup>1</sup>

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**HERE** are practical directions for the feeding of dogs, including an account of the kinds and quantities of feeds that may be used, preparation of feeds, special feeding at different periods of life, and precautions against unwise feeding.

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## DOG FEEDS

THE FEEDS commonly used for dogs include meats and other animal products, vegetables, cereals, and commercial mixtures (dog biscuits,



*Figure 1.*—Proper feeding will help to keep this litter of nine puppies healthy and insure their normal growth.

meals, and canned foods). Bones are considered an essential food by some, but in reality they are merely mineral supplements, which may not be required in many rations (fig. 1).

## MEATS AND OTHER ANIMAL PRODUCTS

Of the various meats and animal products ordinarily available for feeding, most dog owners prefer beef. For economy, cuts from lean

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portions of the carcass are favored. Lamb and mutton also are good meats to use when they are properly prepared and not too high in price. Pork is not greatly relished by dogs generally, probably because of its high fat content, and it is seldom fed. The use of poultry of any kind, particularly those portions having bones that splinter easily, is not generally recommended. In some localities fresh horse meat can be purchased from slaughterhouses at a rather low price. This product is economical and usually satisfactory when fed regularly. However, it should not be used unless it comes from a healthy animal that has been slaughtered and handled in a sanitary manner. Horse meat fed in large amounts infrequently may cause diarrhea.

Fish makes a satisfactory substitute for meat when given occasionally (about once weekly), provided it does not contain harmful bones. Wholesome canned salmon is a preferred fish food and is the one most often used. Salmon is especially valuable and useful when fresh meat cannot be obtained. Canned tuna fish is also suitable, as is cod. Cows' milk and hens' eggs are other valuable meat substitutes. They can be included in the rations of many dogs, particularly young, growing puppies and breeding stock. Skim milk and buttermilk, including the dried forms, are good feeds for some dogs, particularly mature animals, but they are not used as extensively as whole milk.

Methods of feeding meat vary with individual owners and handlers. Some prefer to give all mature animals raw meat, others favor cooking it, and still others feed raw and cooked meats alternately. The last-mentioned plan gives variety, which may be a very important factor when the dogs are finicky eaters, and is often desirable. With ordinary refrigeration, cooked meat usually keeps in good condition longer than raw meat. Unless the cooking is properly done, however, it may remove considerable nutriment from the meat. Meat for dogs may be boiled, roasted, or broiled, but should not be fried. Food losses during cooking may be minimized if the cellular structure in the outer surface of the meat is closed by immersing it in rapidly boiling water for a short time or by searing it. Thereafter, the cooking should proceed slowly, and the broth or meat juices obtained in some instances should not be discarded, because they are valuable for moistening stale bread, dog biscuits, and dry cereal feeds.

Many dog raisers believe that meat feeding should be begun early, when the puppy is approximately 3 weeks old. At this age, about a teaspoonful of finely ground, lean hamburger or well-minced, raw, lean beef (slightly seasoned with salt) may be given most puppies once daily. This allotment should be increased daily thereafter, in order to accustom the puppy to solid food and prepare it for weaning at 6 weeks of age. As with all feeds, the amount of meat to give any young dog varies somewhat and is dependent on a number of factors. Ordinarily, however, a 6-weeks-old weaned puppy of a medium-sized breed may be fed one or two tablespoonfuls of lean meat daily, though it is sometimes advisable to begin with less if the puppy is not used to this food. Puppies of the smaller breeds, of course, need less meat than this and those of the larger breeds more. As the animals grow older the meat allotment should be increased gradually until they are receiving a full allowance, that is, the amount required

at maturity. Puppies are placed on full feed ordinarily between the ages of 4 and 12 months, the time being determined principally by the size of the breed to which they belong. Dogs of the small breeds usually are mature when 1 year old, and they may receive a full meat ration at 4 to 6 months of age. In the larger breeds, maturity is attained at 1½ to 2½ years, and in most instances puppies of such breeds may receive full feed when 8 to 12 months old.

The meat given to mature dogs may be fed in large chunks, in medium-sized pieces, or ground. Meat should not be fed on the bone unless the bones are quite large and will not splinter or lodge in the mouth, throat, stomach, or intestinal tract. Most poultry bones splinter, fish bones are sharp and very dangerous, and some lamb and mutton bones lodge badly. None of these or other bones of similar character should ever be used.

In cold climates and in cold weather more meat is usually fed than in warm climates and in hot weather. Moreover, if the dog is closely confined a considerable part of the time and is given little exercise, the meat allowance generally should be less than when the animal is living under outdoor conditions with an unlimited range of activity.

Although the dog is a carnivorous animal and well equipped to digest and assimilate various kinds of meat, some portions of this food are much more valuable than others. Skin, tendons, and cartilage are not digested easily, and it is not advisable to include a large proportion of these in the average ration. Both muscle tissue and glandular organs are required for the best feeding results under general conditions, and they may be given at different times. Of the internal organs, the heart, liver, and tripe are most often used. Muscle tissue keeps fairly well raw with adequate refrigeration, but ordinarily it is necessary to cook glandular organs if they are to be kept for any length of time. Most meat is so thoroughly digested by the dog that little residue is left as fecal matter. Because of this, heavy meat feeding is conducive to constipation.

When salmon is fed as a meat substitute, it usually is given as it comes from the can. The same applies to tuna fish. Other fish may be fed cooked or raw, but they are preferable when cooked and always must be boned thoroughly. Because the protein content of fish is usually somewhat lower than that of good lean meat, it is necessary to feed more fish to obtain the same protein balance. On the average, one-fourth to one-half more fish will be required for this purpose, unless other protein feeds are substituted.

Except for young puppies, cows' milk is ordinarily fed unmodified. The amount of milk different dogs will consume is variable, but except for puppies and some breeding stock, ¼ to 1 pint is a normal daily allowance for most small and medium-sized animals, and 1 to 2 quarts should be ample for large dogs. As a matter of economy, skim milk may be substituted for whole milk in some cases. This substitution should not be made for young puppies, however, and it is probable that brood bitches also will do better on whole milk.

Eggs may be given raw with or without milk, or they may be slightly heated in hot water (coddled) before feeding. Occasionally eggs are fed hard-boiled and chopped. When eggs are used in the diet, only one or two should be allowed daily in most instances, except that more

may be given to breeding animals, sick or convalescent dogs, and some fast-growing puppies of the large breeds. Eggs are also a valuable feed for conditioning purposes and many exhibitors use them extensively to put their charges in "show shape."

Meat or other animal products are primarily protein-supplying feeds of excellent biological value for growth and development in young animals and for repair of tissues and reproduction in mature stock. For the best feeding results, they must be regularly included in dog rations.

The proportion of animal protein feeds as compared with other feeds in the ration varies in practice, but there is no definite agreement on optimum requirements. In fact, there is a wide diversity of opinion among owners and breeders regarding the correct allotment for average conditions. Under many circumstances, however, it has been found to be good practice to make the ration about 50 percent of meat or meat substitutes (by weight) for most mature dogs, and 65 to 75 percent for young puppies and for pregnant and lactating bitches.

#### VEGETABLES

The primary functions of vegetables in the dog ration are to furnish vitamins and minerals, supply bulk—act as fillers—and regulate the bowels.

Of the common vegetables, carrots, tomatoes, spinach, onions, and beets are fed rather extensively. Cabbage, turnips, string beans, and certain other green vegetables are sometimes used. Potatoes, fresh corn, shelled beans, and peas are considered undesirable by many dog owners, because some are hard to digest and others are believed to cause disorders of the skin or of the digestive system.

Methods of preparing and feeding vegetables vary somewhat depending on the kind used. Root vegetables have a large amount of indigestible cellulose and must be cooked if it is desired to liberate the starch for feed purposes. Beets and carrots may be fed raw, if the primary purpose is to supply bulk to the ration. Raw tomatoes are particularly suitable because they can be mashed easily and mixed with various other feeds. Thorough mixing of vegetables with the other feeds is important, for otherwise many dogs will refuse to eat them. A satisfactory way of mixing some vegetables with meat is to cook them together as a stew. Meat and vegetables also may be sliced or chopped, mixed, and run through a meat grinder together. Where a variety of vegetables is available, it is well to select the ones that are liked best by the dogs. The extensive use of vegetables having a high fiber content should generally be avoided.

Where feeds of animal origin make up one-half of the ration of mature dogs, vegetables may constitute about one-half of the remainder, or 25 percent of the total. If this results in excessive looseness of the bowels or other digestive disturbances, the amount of vegetables usually should be decreased somewhat. However, those who live in communities where farm livestock feeds can be bought may find that a small quantity of dried beet pulp, added to the dog's ration as a corrective when vegetable feeding causes diarrhea, will give beneficial results. Diarrhea is also checked in many cases by the feeding of small quantities of bonemeal.

## CEREALS AND CEREAL PRODUCTS

The various cereal grains and certain cereal products generally are not greatly relished by dogs. Such foods should be used in most cases, nevertheless, since they are valuable in supplying bulk, energy, protein, some vitamins, and minerals. The cereal grains most commonly utilized in some form for dog feeding are corn, rice, oats, wheat, and barley.

Corn is used chiefly as meal to make corn bread—a feed that is best adapted to cold-weather rations and for dogs getting abundant exercise. Corn bread is high in carbohydrates and is not recommended for animals suffering from skin disorders.

Rice is considered a suitable dog feed by some but not by others. To be satisfactory for use, it must be cooked thoroughly and it should be slightly seasoned with salt to increase palatability. Unpolished rice is superior to the common polished type in mineral and vitamin content, but it is also higher in fiber content. Some authorities think cooked rice causes skin troubles similar to eczema, but this may be due to deficiencies in the ration because of an overuse of rice.

Oats are sometimes of value for dogs if ground or rolled. Such feed must be cooked thoroughly. Like corn bread, it is best for active, outdoor dogs and for cold-weather rations. Injudicious use of oatmeal is said to cause certain skin troubles and intestinal disorders.

Except in commercially prepared canned foods, wheat is seldom used as a cooked grain for dog feeding, but various products made from this cereal often find their way into the canine ration. Chief of these are bread, some dry prepared breakfast foods, and dog biscuits and meals. Bread is useful in a variety of forms. Sometimes it is given buttered to tempt the appetites of young puppies and dogs off feed. Dried or toasted bread that is not needed for human use makes a good cereal food for dogs when given in combination with meat broths, soups, or milk. When fed in this way, only enough liquid should be added to moisten the bread. Bread must never be used if it is moldy.

When prepared breakfast foods made from wheat or other cereal grains are fed, they are usually moistened with milk, meat broth, soup, or water. Such foods seem particularly suitable for a light morning meal, and they are being used rather extensively. If a number of dogs are owned, it is often possible to economize on the purchase of dry prepared breakfast foods by getting those portions that have been broken or crushed in the manufacturing process. This food cannot be marketed for human consumption and sells for a relatively low price.

Dog biscuits of various kinds are also generally suitable for supplying the cereal portion of the ration. They may be fed dry, moistened, or mixed with cooked meat and vegetables. These biscuits can be obtained in many sizes and shapes (square, oval, bone-shaped, cubes, pellets, or kibbled—broken into small pieces), and their composition is variable, depending on the specific use for which they are intended. However, practically all of them are high in cereal and low in moisture content, and they consist of various combinations of meat byproducts or meat, cereal grains or products thereof, ground bone, dried-milk products, legume meals, cod-liver oil, fish meal, molasses, salt, yeast, and other substances. Commercially made dog meals are usually similar to dog biscuits in composition, but they are ordinarily not so well adapted to a variety of uses. They are generally fed mixed with water or milk.

Barley is not a very palatable dog feed, but it is used in the cooked form in some commercial mixtures, and barley water and gruel have been found useful for some sick animals and finicky eaters.

In many instances, cereals may constitute approximately 25 percent of the total feed of mature dogs with satisfactory results. Moreover, if it is necessary to reduce the amount of vegetables below the 25-percent allotment previously mentioned, cereals may be used as a substitute for the vegetables removed.

#### CANNED DOG FEEDS

Most of the feeds already mentioned are well adapted to home preparation and mixing. In addition, there are available a large number of proprietary, ready-to-eat, canned mixtures and canned meat products made expressly for dog feeding. The composition of these mixtures is quite variable, depending on the individual formula and the quality of ingredients used, but in general they consist of cooked combinations of meat byproducts or meat, fish or fish meal, cereals and cereal products, vegetables or vegetable products, ground bone and other mineral matter, and various accessory substances, such as yeast, cod-liver oil, and charcoal. Judging from the analyses of some of these mixtures, they are usually characterized by a high moisture content—65 to 75 percent or more. Moreover, while they are about equal to dry dog biscuits and other dry commercial dog foods in fat content, they are usually much lower in protein, carbohydrate (as nitrogen-free extract), and mineral matter. Most canned mixed foods are intended to be used without supplements. Canned meat products, however, are adapted to mixing with other feed, such as vegetables and cereals.

The use of canned dog feeds has become quite extensive in the United States within recent years, and many such products are now marketed and advertised as complete dog rations. No doubt a considerable part of the growth in popularity of the commercial mixtures is attributable to the fact that these foods generally need no preparation and can be quickly and easily fed. These advantages, however, may at times become disadvantages, particularly when they tend to rob the dog of the necessary balance or variety of diet or when they are uneconomical.

The extent to which canned dog feeds should be used in any given case depends primarily on the needs of the dog and the relative quality, composition, and economy of the canned products compared with home-prepared rations. The labels on most canned dog foods contain data on the kinds and percentages of ingredients in the mixtures, and this information is useful in judging the merits of individual and competitive brands in some instances. Unfortunately, however, the average dog owner cannot usually determine the biological values of the canned products from the tables of contents and statements of analyses; he does not know the optimum percentages of the different nutrients required by dogs of different ages and kinds; he cannot estimate whether the commercial foods are as economical and wholesome as home-prepared rations; nor can he follow the quantitative feeding recommendations some manufacturers give and obtain optimum results. Because of these considerations, it is believed that the economy, practicability, and desirability of using canned dog-feed

mixtures extensively may best be determined by individual owners through trial feeding tests. This seems to be particularly essential where no supplementary feeds are used with the commercial mixtures. Moreover, before selecting any canned feed mixture it is well to study the manufacturer's statement of ingredients and analysis, especially the protein, water, fat, and fiber contents; determine if possible by examination whether it contains adulterants or harmful ingredients; and check the net weight and feeding recommendations.

### BONES

A great deal may be said regarding the merits and demerits of using bones in dog feeding. Bones are undoubtedly a good source of calcium and phosphorus, they can be digested fairly well by the dog when eaten correctly, and they are valuable for puppies during teething. However, because of the serious or fatal results that may follow the use of some bones, because excessive bone feeding causes constipation, and because bone eating results in abnormal wearing and breaking of the teeth and provokes fights over possession of the bone, it appears that the demerits overbalance the merits. In most instances, therefore, it seems advisable to feed few bones and to rely on other feeds as sources of mineral matter. If these are not adequate, some ground bonemeal can be added to the ration. A specially prepared, steamed bonemeal made for livestock feeding is suitable for this purpose and is available in feed stores in most large communities. Only a small quantity of bonemeal will be needed to supply the calcium and phosphorus requirements of most dogs. The needs of puppies and brood bitches, of course, will be higher than those of other dogs, and allowance for the age and use of the animal should be made when feeding this mineral supplement.

### WATER

Regardless of the kinds or quantities of meat, vegetables, cereals, or other feeds used in the ration, it is essential that all dogs except very young puppies be supplied with plenty of fresh, clean, cool drinking water. Some kennels utilize automatic drinking fountains or other water-supplying devices for this purpose. Where fountains are not used, the water in the drinking pans or crocks should be changed several times daily, especially during hot weather. Moreover, it usually is advisable to provide a separate water container for each dog or small group of dogs, and such receptacles must be kept clean.

## FEEDING PRACTICES

### FEEDING THE BROOD BITCH

When the bitch is neither nursing puppies nor developing unborn young, her feeding program may be about the same as that of other mature dogs. The principal aim should be to keep her in a sound, healthy condition and in medium flesh. One or two meals daily should be sufficient.

When the bitch has been bred and the fetuses are developing, several changes in the regular ration will be necessary. It is particularly essential that the amount of feed be carefully and properly regulated

at all stages of pregnancy. For a short time after conception the aim should be to maintain the bitch's weight or increase it very slightly. Two meals daily are ordinarily sufficient for this purpose, and the amount of feed need be increased only slightly over that given before conception. As pregnancy advances, however, the allotment of feed should be gradually raised, and the number of daily feedings increased to three or four. Growth of the embryos is greatest during the last month of pregnancy, and the amount of feed needed during this stage may be about twice that ordinarily given before conception.

Throughout pregnancy the feeds should include liberal amounts of lean meat, eggs, salmon or other fish, milk, and meat broths. Limited allowances of cereals and vegetables also may be included in the ration during most of the period, but not in proportions as great as those given before conception. Some breeders advocate discontinuance of cereal and vegetable feeding during the latter part of the pregnancy period, particularly the last week, in order to prevent overloading of the intestinal tract and undue crowding of the fetuses. About a week before parturition it is usually advisable to make the ration slightly laxative in character. This may be accomplished by giving small daily doses of milk of magnesia or some other mild laxative.

When whelping has taken place, the feeding of the bitch requires especial attention until after weaning time. Feed for the 3 days following parturition should be laxative in character, moderate in quantity, and light in composition. During the first day moderate amounts of warm milk, water, meat broths, or gruels are best. These and other light, sloppy foods should be given the second and third days also. After this the bitch may be changed back gradually to a more solid, substantial ration, such as the one used during pregnancy, except that the amount of vegetables may be reduced considerably or eliminated in order to decrease bulk, facilitate the utilization of more concentrated feeds, and possibly prevent the formation of acid milk, which some authorities believe is induced by vegetable feeding and which produces indigestion in nursing puppies. If the bitch suffers from constipation due to lack of vegetables, this may be corrected by small doses of milk of magnesia.

The quantity of feed given during the nursing period should be regulated to meet the bitch's condition and the demands made on her by the suckling puppies. Feed requirements will naturally increase as the youngsters gain in size, so the bitch's ration must be ample to meet these requirements. In many cases the requirement will be twice that of the nonpregnant, nonlactating bitch. Milk is a particularly valuable food at this time, and liberal amounts of it should be given. The other feeds used must insure adequate protein, mineral matter, and vitamins for proper muscular and skeletal development of the litter. Just prior to weaning time (6 weeks) it may be necessary to reduce the bitch's milk flow. To accomplish this the milk portion of the ration may be gradually diminished or discontinued entirely, and the amounts of the other feeds should be decreased considerably. If the milk flow is not stopped by this procedure, one or two puppies may be allowed to nurse the bitch occasionally for a short period, or she may be partially milked out by hand for several days.



After weaning, the bitch may be returned to her regular ration, provided she is in good condition. If the bitch has lost much weight during the lactation period, she must be fed more than a maintenance ration. The quantity and quality of feed should be sufficient so that she may regain her losses and return to normal condition in about a month's time.

#### FEEDING THE STUD DOG

In some respects the feeding of stud dogs (breeding males) is similar to that of brood bitches. When not being used for breeding work, the stud dog may be fed about the same as other mature dogs. While in regular service, however, the sire often requires a ration containing more food, particularly feeds that supply protein. When several services are made weekly over an extended period, it may be well to feed the stud dog three times daily, and liberal use should be made of eggs, meat, and milk in his ration. If breeding service is not extensive, two meals daily should be sufficient, and the quantity of feed need be increased very little. Eggs, meat, and milk should be a prominent part of such a ration, however. The aim in feeding any stud dog should be to keep his body weight about uniform and his physical condition excellent. When this is done he will be surer in service and, other things being equal, his puppies should be sound and sturdy.

#### FEEDING PUPPIES

Generally, the sole feed of puppies for at least the first 3 weeks of their lives is the mother's milk. The first milk is called colostrum, and it is vital that the youngsters receive this. Since puppies are born blind and are unable to walk, it may be necessary to place them at their dam's breasts for the first nursings to insure their getting colostrum. (See article on *The Nutrition of Very Young Animals*, p. 501.)

After 3 weeks of nursing the puppy may be gradually accustomed to other food. Cows' milk is generally the best food to start with, and later this can be used in combination with stale bread, dry breakfast cereals, and puppy cakes or puppy meal. The milk usually should be fed undiluted, and it should be warmed to approximately body temperature.

In addition to the diet of bread, breakfast cereal, puppy meal or cakes, and milk, at about 3 weeks of age the youngsters should be given their first feeding of meat. The use of this feed in the puppy ration has already been discussed. Raw eggs beaten up in milk, unsweetened evaporated milk, and nongreasy broths made from meats and poured over dry bread or puppy biscuits to moisten them are other valuable feeds for puppies during the preweaning stage.

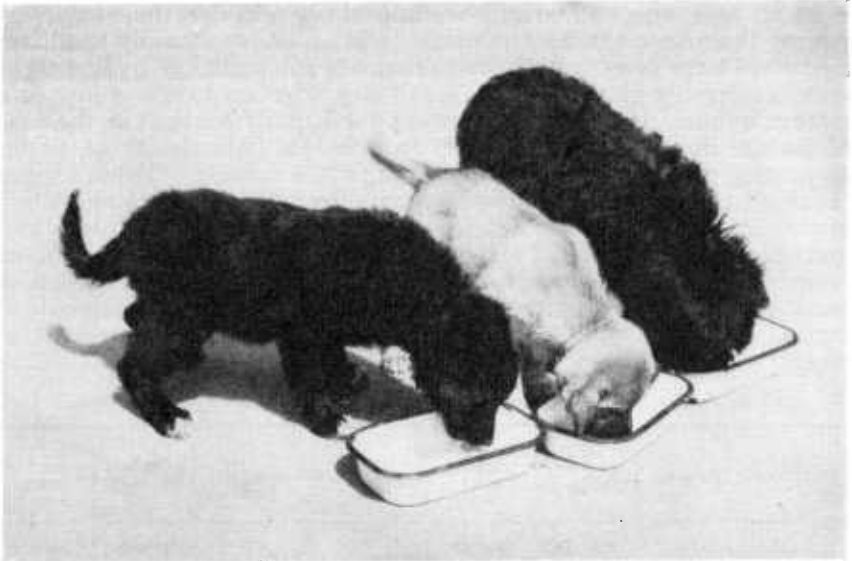
If puppies have been properly cared for and taught to eat solid and semisolid foods before weaning, no great trouble should be experienced from a feeding standpoint in raising them to maturity. The most important things to remember are to feed them regularly and often, to give feeds that will provide the required bone- and body-building material, to see that all feeds are of good quality and ample quantity, and to keep the feeding and drinking utensils clean (fig. 2).

The young dog is quite similar to the young child in its feeding habits

and should be fed a little at a time and often. Immediately after weaning it is usually necessary to feed five or six times daily. Later, young dogs may be fed less frequently, but the amount of food given at each meal must be increased. The schedule of feedings and the amount of food given at each meal are determined by the size of the dog, the stage of maturity, and the kind of feed. In the small breeds, one feeding may be discontinued about every 2½ months until the dog is on a two-meal diet when 1 year old. Dogs of the larger breeds cannot have their feeding schedules changed so often, and there may be intervals of 3 to 4 months between changes. At no time during the growing period should puppies be allowed access to food at will. Rather, the animal should be given about 10 minutes in which to clean up each meal, and at the end of this time the uneaten portion should be removed. By following this practice puppies are kept "on feed," and they do not get food that is spoiled or dirty. When a number of puppies are fed, it generally is best to give them individual feed pans. In this way each dog will be sure to get the desired amount and kind of food, and the weaker ones will not be bullied and robbed by their stronger mates.

Throughout the growing period the feeds should include liberal amounts of lean meat, milk, eggs, salmon or other fish, and meat broths. Cereals and vegetables may be included also in limited quantities, but they should not constitute a very large part of the ration during the early stages of puppyhood, and they should never be used in proportions as great as those given to mature animals.

In addition to the regular feed given a puppy, many dog owners have found it advisable to include a small quantity of cod-liver oil in the



*Figure 2.*—Puppies do not always show such good manners as this, but individual feed pans, kept scrupulously clean, and regular meal times will help to keep them healthy and happy.

daily ration. Beginning with a few drops at the start, the amount may be increased gradually up to one or more teaspoonfuls daily, depending on the needs of the animal. The use of cod-liver oil is generally most necessary during winter months and when the dogs are not allowed to run in the open where there is plenty of sunshine. The feeding of cod-liver oil is also indicated where there are tendencies to develop rickets. Usually the cod-liver oil should be mixed with the food to simplify feeding it.

### QUANTITIES OF FEED REQUIRED

The quantities of feed required daily by dogs are influenced and determined by a number of factors: The age, size, individuality, and physical condition of the animal; the kind, quality, character, and proportions of the various feeds in the ration; the climate, environment, and methods of management; and the type and amount of work done, or the degree of exercise. Of these considerations, the age and size of the dog and the kind and amount of work are particularly important in determining feed requirements.

The influence of age on feed requirements is especially noticeable during the first 6 months of life, and the quantity of nutrients necessary to care properly for rapid muscular and skeletal growth, metabolism, and other vital functions is proportionately high. During this period the amount of feed required per pound of body weight of the puppy may be two to three times that of mature dogs of the same type or breed kept under comparable conditions. Moreover, the quantities of feed are greatest per pound of body weight at the youngest ages and decline gradually until maturity. Increases in body weight and size usually vary in the same manner.

At all ages, size and weight are important considerations in determining the amount of feed required. Small dogs naturally need less feed than large ones, but the requirements per pound of body weight are considerably greater for the small dog, whether it is a puppy or a mature animal. Such differences are particularly marked in the case of mature dogs that vary greatly in size—for example, those under 10 pounds compared with those of 150 to 225 pounds. Table 1 gives the approximate daily feed requirements (exclusive of drinking water) of mature dogs of various weights kept under average conditions and exercising moderately. This computation is based on home-mixed rations consisting of meat, fish, eggs, milk, vegetables, and cereals of good quality. The proportions are approximately 50 percent of animal protein foods, 25 percent of vegetables, and 25 percent of cereals.

TABLE 1.—*Approximate quantities of feed required daily by mature dogs*

Body weight (pounds)	Total feed (wet basis)		Body weight (pounds)	Total feed (wet basis)	
	Pounds	Ounces		Pounds	Ounces
1.....	$\frac{1}{8}$	2.00	75.....	$3\frac{1}{4}$	0.70
10.....	$\frac{3}{4}$	1.20	100.....	4	.64
25.....	$1\frac{1}{2}$	.96	150.....	$5\frac{1}{4}$	.56
50.....	$2\frac{1}{2}$	.80	225.....	7	.50

The influence of reproduction and lactation on the feed requirements of breeding stock has been noted. Ordinary physical activity (work and exercise) is also important in determining feed requirements, and careful consideration should be given this matter when planning rations. To determine the amount of feed that will give best results for dogs that are very inactive or those doing hard work, it is advisable to try rations containing different quantities and combinations of nutrients. For the very inactive dog, the allotment probably can be reduced 25 to 35 percent below the recommendations given in table 1. For hard-working animals, however, an increase of 25 percent or more may be needed (fig. 3).

Ordinarily, the effects of the quality, kind, character, and proportions of nutrients on quantitative requirements are most significant when very dry feeds or those of low energy and biological value are used extensively. When the moisture content of the ration is low, as when dry foods are used to any great extent, considerably smaller quantities of feed may be needed. If the energy value or the protein content of the food is low, or the proteins are of poor quality, more feed should be given. Where radical departures are made from the recommendations already given for the proportions of animal protein foods, vegetables, and cereals, the total quantity of feed will probably have to be changed also, and in fact the ration may not give satisfactory results. Particularly is this true in the case of puppies and brood bitches.

### FEED ECONOMIES

By careful planning and the adoption of correct feeding practices it is often possible to effect economies in rations without sacrificing either the efficiency of the feed or the health of the dog.

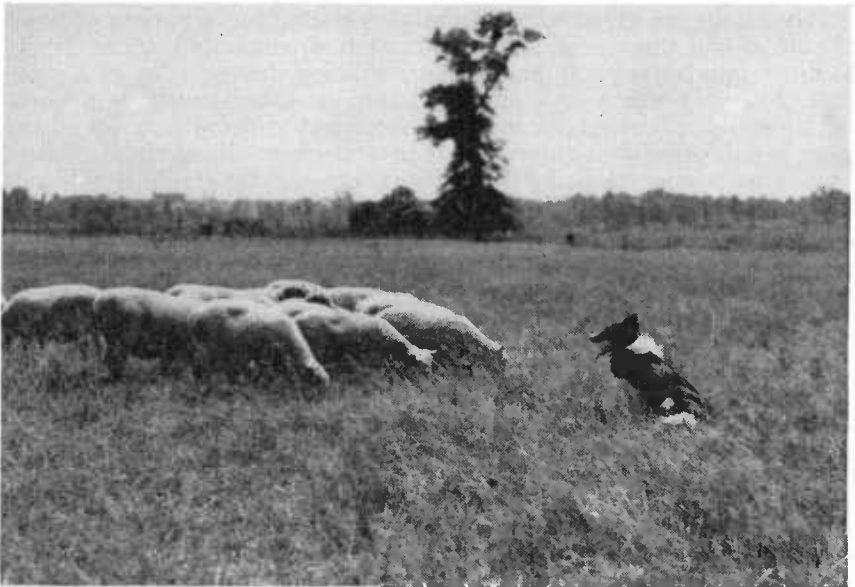


Figure 3.—Hard-working dogs require more feed than idle animals.

Where one dog of small size is kept, it may be practical to obtain a considerable portion of the food from table scraps, particularly stale bread, some vegetables, cereals, and meats, sour milk, etc. In the utilization of such food it is of course necessary to exclude fried and highly seasoned meats, dangerous bones, unsuitable vegetables and cereal products, and all other substances that have been mentioned here as undesirable. Moreover, the frequent tendency and temptation to use the dog as a scavenger or a second garbage pail is most certainly to be avoided.

When more than one dog is fed, considerable economies cannot usually be obtained by using table left-overs, but they may sometimes be effected by purchasing feed in quantities and by obtaining stale bread, cracked eggs, good meat scraps, broken cereals, and similar products that cannot be marketed for human use but are sound, wholesome, and entirely satisfactory for dogs. Also, in the purchase of meats it is not necessary to get the prime or top grades. In fact, the medium grades of meat are not only lower in price per pound but also a better feed for dogs, because such meat contains a higher proportion of lean and therefore a greater percentage of protein.

Feed economies may also be effected by studying the habits, preferences, and idiosyncrasies of each dog. Although this article has attempted to outline general rules of dog feeding, the matter of individuality is a factor that only the owner or feeder is in a position to observe and handle, and he must determine the correct proportions and kinds of feed that will give optimum results under specific conditions. Once these facts have been established, there should be little food waste.

### FEED DEFICIENCIES

When dogs are given adequate rations containing a variety of feeds of animal and plant origin such as have been suggested, there should be no serious nutritional deficiencies requiring the use of special products to supply vitamins, mineral matter, or other nutrients. There are instances, of course, as in the case of fast-growing puppies of the large breeds or bitches nursing large litters, where vitamin and mineral supplements may be beneficial. However, such products should not be employed indiscriminately, nor should dogs be dosed with proprietary articles to cure or correct conditions that are largely imaginary or that do not result from faulty nutrition. If the dog does not thrive on a ration of sound, wholesome foods, a veterinarian should be consulted.

### FEEDING SUGGESTIONS IN BRIEF

Many dogs are overfed. Others do not receive adequate rations. Both extremes should be avoided, but particularly overfeeding.

Overfeeding, coupled with lack of exercise, usually produces excessive body weight and laziness, and it may induce sickness and impotency.

Prolonged undernourishment causes loss of weight, listlessness, sickness, and death.

The aim in feeding puppies should be to keep them growing steadily and uniformly, but not too fast.

It is usually advisable to keep puppies just a trifle hungry. This may be accomplished by feeding a little at a time and often.

An adequate ration will keep most mature dogs at a uniform body weight and in a lean, thrifty condition. This is a very useful guide in determining the correct amounts to feed.

Generally, the use of too hot, too cold, highly seasoned, fried, or sweet foods should be avoided. However, most cooked foods should be slightly seasoned with salt.

The appetite of the dog cannot usually be taken as a guide to its feed requirements. Many dogs will overeat if given the opportunity.

The axiom, "One man's meat is another man's poison," is applicable to dogs also. Feeds that are not tolerated by the dog or those that cause digestive and other disturbances should not be used.

The use of moldy, spoiled, or rotten feed is never a good practice.

The excessive use of feeds of low energy content and low biological values will often result in poor condition and may cause loss of weight and paunchiness.

Economies in rations and feeding practices are desirable, but not if they are obtained at the expense of the dog's health and efficiency.

All feeding and drinking utensils must be kept scrupulously clean.

The crude-fiber content of the ration should be kept at a low level, usually below 2 percent. This is ordinarily accomplished by a ration that contains a good proportion of feeds of animal origin.

It is usually desirable to reduce the feed allotment during hot weather.

Dogs should be fed at regular intervals, and the best results generally may be expected when regular feeding is accompanied by regular exercise.

Most dogs do not thrive on a ration containing large amounts of sloppy feeds, and excessive bulk is particularly to be avoided in the feed of hard-working dogs, puppies, and pregnant and lactating bitches.

Hard-working dogs and those getting abundant exercise require less vegetable matter in the ration than idle, nonworking animals.

Maintenance of a weekly weight chart is useful, and it is especially advisable where numbers of dogs are being fed.

If the ration is known to be adequate and the dog is losing weight or is not in good condition, the presence of internal parasites is to be suspected.

It is not usually advisable to feed either directly before or directly after working or exercising the dog. Rather, allow the dog an hour of rest before feeding.

The feed requirements of puppies, working dogs, and brood bitches are often quite high. The use of feeds of high energy and biological value—preferably feeds of animal origin—is particularly valuable for such stock.

Sometimes dogs go "off feed" for a day or two. When this occurs they should not be forced to eat, but if they do not voluntarily return to feed within 2 days, a veterinarian should be consulted.

In general, sick and convalescent dogs need easily digested, readily assimilable feed, but no specific recommendations that will apply to various diseases and conditions can be given.

Although the dog may show no immediate or outward signs of the effects of improper feeding or malnutrition, this does not prove that no harm is done.

A good coat, bright clear eyes, and an abundance of pep are reliable indications that the ration is adequate.

Mature dogs are usually fed twice daily, a light meal in the morning and a heavier meal in the afternoon or evening. However, if the dog is used for watch or guard purposes at night, it is best to give the heavier meal in the morning.

The ultimate aim of feeding should be to obtain longevity and a constant state of good health.