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The calves fed buttermilk had no digestive trouble, however. It is important that the milk be uniform. The feeding of old, sour milk to calves that are accustomed to sweet milk results in digestive disturbances.

The amount of milk needed by the calf depends upon the size and age. For the first three weeks from eight to ten pounds a day is usually sufficient. The amount may be gradually increased until at six weeks of age the animal may consume from twelve to fourteen pounds. The calf rarely needs over eighteen pounds at any age before weaning. More trouble results from overfeeding than underfeeding. Especially is this true in feeding skim-milk.

The average man thinks that because the butter fat has been removed from the milk he should feed more of the skim-milk to replace this in some way. As a consequence the calf is given more than it can digest. A change in the amount fed should be gradual. An underfeed one day and an overload the next are usually the causes of trouble.

The Calf's Grain Stomach.

After the first two weeks the calf's feed may be gradually changed to skimmilk. A small amount of skim-milk may be mixed with the whole milk at first and the amount increased each feed. At the same time the amount of whole milk should be decreased until at the end of a week the calf is getting skim-milk only. The calf may be taught to eat grain and hay at an early age if a little grain is rubbed into its mouth just after it has finished drinking milk. The mixing of the grain with the milk is not a good practice. The action of the saliva helps in the digestion of the grain. If mixed with the milk it is gulped down and is not mixed with the saliva.

The grain that is fed to the calf receiving skim-milk should supply the fat that the milk lacks. Cornmeal or shelled corn has proved the best supplement for skim-milk. The most extensive investigation in this subject has been made by the Iowa Experiment Station. Oilmeal, oatmeal, cornmeal mixed with flaxseed, and cornmeal alone, were fed to calves and the results compared. Slightly larger gains were obtained

from cornmeal.

It was found by the Kansas Experiment Station that after the calves were well started at eating grain shelled corn gave equal if not better results than cornmeal. By the time the calf is six weeks old it will usually eat about half a pound of grain a day; at two months, a pound a day; and at three or four months, two pounds a day. When the calf becomes older, approaching weaning time, it should have some oats, bran or oilmeal in addition to the corn. The protein in the milk is not sufficient.

How to Raise Chicks.

By R. B. Sando.

Little chickens are always interesting, but hard to raise successfully. Frequently it is unsafe to "count one's chickens" even after they are hatched, for early losses usually rob the novice of a good many. It is the number of chicks raised, rather than the number hatched, that makes or mars the profits and pleasures of the business. The foundation for successful chick culture lies in the breeding fowls. Healthy, hardy chicks can be obtained only from the same kind of parent stock. Satisfactory results never come from scrubby or diseased stock. In order to hatch strong chicks the breeders must be well housed, well fed and otherwise properly cared for. Only perfectly formed eggs which have been gathered before they have become chilled should be selected, and the sooner they are set the better.

In a perfect hatch the chicks begin to pip their shells on the twentieth day, and are all out before the end of the twenty-first day. As a rule it does not pay to go to much bother to help chicks out of their shells; if they have not sufficient vitality to free themselves they are seldom worth saving. Moreover, it is harmful to open the incuba- and brooder company, poultry supply tor door or move the old hen round on house or flour and feed exchange. They

er case the cold outside air blowing into the machine is pretty sure to chill the chicks and remove necessary moisture from the hatching chamber, while in the later case the hen is likely to trample on some of the chicks.

If the hatch is a large one, so that the nest or incubator is crowded, it is a good plan when it is about two-thirds over to remove all empty eggshells and see that none of them have slipped over eggs that are hatching. In addition, chicks that seem to need only slight assistance to get out of their shells may have their breathing space picked a little larger by the careful atendant and then slightly moistened with a warm, damp cloth. If there are any crippled or deformed chicks among those that are hatched they may as well be killed at once. It is usually a waste of time and energy to try to raise them; it requires more effort than they are worth.

The First Feed.

Warm, dry comfortable quarters should be provided for the mother hen and her brood some little time before it is necessary to remove them from the nest. In case a brooder is being used, the lamp should be started at least 24 hours before the chicks are to be placed in the machine, so that it may be thoroughly warmed and the flame regulated to maintain the correct temperature. It is best not to be in a hurry to remove chicks from the incubator nursery or from the nest. No chick should ever be disturbed until it has become thoroughly dried off and has had some little time to gain strength. While moving the chicks be very careful to avoid chilling them, for they are very tender and sensitive at this time. Place them in a deep basket and cover them carefully with warm clothes or burlap.

Just before a chick emerges from the shell it takes into his body the unabsorbed remnant of the yolk of the egg, which is provided by Nature to support life for the first few days. The writer never feeds his chicks until they are at least 48 hours old, and frequently not until they are 60. In extreme cases chicks have been known to thrive when given no food until they were three days old, so that to withhold food for two days is no hardship, but really the best

thing to do.

No water should be given until after the chicks have had their first meal; after this it must be kept constantly before them, for when supplied in this way there is less danger of their overdrinking than when it is given only at intervals. Warm the drinking water in cold weather, and always see that the water and drinking vessels are clea free from filth and impurities. Grit and charcoal are also placed before the chicks at the same time they are given their first meal.

The first feed or two should always consist of something dry; it should never be soft, sloppy stuff. Dry bread or cracker crumbs, rolled oats, and finely chopped bits of hard-boiled egg are used by different persons. Any one of these foods is good, as well as any combination of them, since a variety is essen-

tial.

There is no infallible formula for the feeding of little chickens. One of the most nearly universal rules is to feed rather sparingly until the chicks have a good start-that is, feed a little at a time and at frequent intervals. It is always better to feed the chicks a very small amount five or six times a day than to gorge them twice a day. The dry-feeding method is now in more common use than the feeding of moist or wet mashes of ground grains or johnnycake. By the dry-feed method is meant the rearing of little chicks on small seeds and cracked grains, without any soft or wet mixtures of food. We prefer a ration of dry grains and seeds exclusively for the first two or three weeks, with the exception of an occasional feed, for the sake of variety, of finely chopped hard-boiled eggs rolled in cracker or bread crumbs.

One of the safest things for the beginner to use is one of the prepared chick feeds. There are a number of good brands on the market, and they can be secured of almost any incubator the nest at hatching-time. In the form- contain a variety of dry grains and

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