number increasing *pro rata* with the necessary time occupied. The requirements for annual manœuvres and for the annual training camps are separate matters. During the short period of the year when these are taking place, the Army requirements all automatically increase to what is known as their "establishment." In the past it has been found necessary to resort to hiring for obtaining the balance; but, as has already been shown, hiring for these purposes has proved a failure, and obviously if the requisite numbers of horses are not in the country hiring is impossible.

"Again, even the full establishment of horses only represents a portion of the numbers required immediately upon mobilization. For replacements, transport, ambulance, and other Army services a number at least equal to the establishment is at once absorbed, while continuous demands to replace wastage at once commence, the extent depending of course upon the conduct and conditions of the war. Further, upon mobilization a proportion of the civilian element of the population becomes employed directly or indirectly on munitions or other Army requirements and the horses necessary for such trades cannot be requisitioned.

"But before discussing the actual service demands for horses, it is necessary to form some conception of the size and composition of the British Army after the war. This to a large extent must be a matter of pure conjecture. It will necessarily be affected by the conditions of peace, by finance, and by many other questions, all of which will have to be fully discussed and eventually settled by Parliament. Fortunately, the one great point of dissension in pre-war days, namely, voluntary or compulsory service, has now been removed. There are few, if any, to be found to-day to argue whether it will be possible, at any rate in the first decade after the war, to return to a purely voluntary system. The necessity of being prepared and the obligation of every man of military age to bear his share of the national burden are now accepted principles. The main questions therefore arising are: How is preparedness to be obtained at the least cost, and how can compulsory service be made the least burdensome?

As regards the latter, opportunities no doubt will be afforded for men to shorten the period of their trainings by attaining proficiency locally in one or another branch of the service. For instance, by an increase in the number of ranges in the country, men could qualify in marksmanship; signalling and other courses might also be arranged. The extent, however, to which local drills or courses will be developed must necessarily affect any future arrangements about horses—and here it may be asked will horses have to be provided and kept throughout the whole country? The new conditions will be altogether different to those of the past; formerly there were no other means for mounted units to learn to ride except those which could be provided locally. In future, riding will be taught during preliminary trainings, and it is extremely doubtful whether such little practice in riding or driving as could be obtained on occasional summer evenings and Saturday afternoons would be worth the expense and trouble involved in keeping horses for the purpose locally. Even in the case of Artillery such spare time could probably be much more profitably devoted to technical work. In any case it could only apply in towns, as men living in country districts would be debarred from using them.

"It is believed by many that six months' preliminary training with monthly annual trainings during three following years will be the adopted standard. Accepting this as a basis, for the former, which would be continuous, a certain number of horses, as few as possible, will have to be kept permanently at the various depots. As regards the latter, however, the position is entirely different. These trainings only occupy one month; horses, therefore, will only be required for this particular period in the year, so some arrangement must be made to keep them during the remaining eleven months. As every man who has undergone a preliminary course will be called up annually for three further monthly trainings, their number will be largely augmented; in other words, three times as many men as attain the military age in any one year will eventually be annually undergoing their successive monthly training. Again, the six months' course will exist for the main purpose of teaching preliminary work, whereas the monthly trainings will be utilised for more advanced operations, consequently they will entail the provision of a far larger proportion of horses. In the peace establishment in the Territorial Force, including Yeomanry, Artillery, and Infantry, the proportion formerly specified for the training was one horse to every six men, and this number may still be taken as the average.

The census tables show that our annual male birth-rate is approximately 500,000, but for the purpose of estimating the number of men eligible for service in each year this figure must be reduced both by the rate of mortality previous to attaining the age of, say, eighteen years, and also by the inevitable rejections for physical unfitness and other reasons. Accepting the reduced figure of 300,000 as the number who will come up in each year for their preliminary course, the number of the annual monthly trainings after the first two years will reach a total of 900,000 For this figure the proportion of horses that will be required is 150,000. In addition to these, however, the following further requirements must be noted:

(1) The reserve of horses which would be wanted immediately in case of an outbreak of war, i. e., a number equal at least to the ordinary peace establishment.

(2) Horses for the annual manœuvres of the Regular Army and for the training of any national or reserve forces which it may be considered necessary to provide.

(3) The necessary supply to cover wastage during war.

"To what extent provision may be necessary for these two latter items is open to argument. It may fairly be contended that the development of the motor car will apply to many Army requirements, and that the number of horses wanted for certain purposes will therefore be decreased. Again, it may be considered safe to rely entirely upon the importation of horses from overseas to cover wastage in war; it will probably be admitted, however, that 300,000 horses is the fewest which must be always immediately available for monthly trainings in peace, and for mounting our Army in time of war."

LIVE STOCK.

Maintenance and Fattening Rations.

Throughout the last decade there has not been a season when it was so necessary as it is now to consider the stores and determine what to feed and how to feed it. In the first place all grains and mill-feeds are unusually high in price; there was a poor crop of coarse grains in Ontario as well as a small yield of roots and silage corn; hay yielded abundantly, but straw was short. There are individual exceptions to these conditions in Ontario, and in some few instances communities might be favored to a slight extent; yet, generally speaking, there are full hay mows, but low grain bins, silos and root cellars. A shortage of grain and succulent feeds at the same time presents difficulties which call for a careful consideration of the stores in hand and for well-laid plans regarding the winter feeding. In these times every farmer knows pretty well what amount of feed he has in his mow, stacks, bins and silos. With a little calculating he can also foretell what his stock will require to carry them through; these are the first factors to consider. Again, roughages and concentrates should be so combined as to give maximum results with a minimum of waste. Hay alone is not a good feed for store cattle nor for feeders that will be finished next June on grass, yet with some silage, roots, corn fodder or a small quantity of concentrates added, hay will do its part well in bringing the steers and heifers through the winter in a thrifty condition. Many will have ample roughage but not sufficient grain or silage to mix with it that the coarse fodder can be fed to advantage. It is this matter that requires, first, a careful study of the table in this department showing the digestibility of our common feeding stuffs, and second, some deductions made therefrom that will ensure economical feeding or, in other words, balanced combinations. If one does not adhere closely to the balanced ration he should endeavor, at least, to feed protein-rich feeding stuffs along with those carrying a large percentage of carbohydrates and fats. This is only the first step in scientific or economical feeding. We appreciate the fact that stockmen desire more particularly to know what and how much to feed, and, in individual instances, an answer can be given; yet there are so many different opportunities presented to feeders, according to their localities, that the subject can be discussed in a general way only. To those who would pass over this matter lightly let us suggest that when anyone intends to enter through a locked door it is convenient to have a key. Similarly it is just as well to understand feeding stuffs first and then combine them as the information at hand would indicate as best. Several standards have been set up, showing the quantities and approximate relationship between the protein and carbohydrates in the ration. Dairymen observe them closely, but, for horses, cattle, sheep and swine, they serve more as a guide and should not be followed too religiously.

Wintering Store Cattle.

Throughout many sections of Ontario two-year-old cattle are wintered on a maintenance ration, or, in other words, they are given just enough feed so they neither gain nor lose in weight. Thousands of steers are boarded out in farmers' stables on just such allowances for $10 to $12 for the winter. In the spring they are lifted by their owners, who are usually extensive cattle dealers, and grassed for the summer, when they are sold as finished bullocks. Sometimes when the winter feed is pretty good the steers will make slight gains, and the price paid for such accommodation will vary according to the results. Thousands of cattle will be wintered on similar rations this year, and, without entering into a discussion of feeding this class of live stock for six months with no gains, let us consider what a maintenance ration may consist of.

There is considerable hay, and no doubt it will form a part of all rations this season, but there is usually straw, corn fodder, corn stover (corn stalks with ears removed), and clover chaff. If there is any silage or roots to spare it will be easy to make a fattening or gaining ration out of what would ordinarily be a maintenance allowance.

A steer of 1,000 lbs. live weight will require in the neighborhood of 18 lbs. dry matter per day. (To thoroughly understand the term "dry matter" refer to the table in this department and to notes regarding same.) However, the amount of dry matter actually needed will depend somewhat on the constituents of the feeds. The nutritive ratio of a maintenance allowance may be as wide as 1 part of protein to 12 parts of carbohydrates and fats. The following ration has been proven capable of maintaining an ox, weighing 1,000 lbs., at rest in a stall with neither gain nor loss:

Feeding stuff	Dry matter	Crude protein	Carbohydrates	Fats
	Lbs.	Lbs.	Lbs.	Lbs.
Clover hay, 5 lbs.	4.36	0.38	1.96	0.09
Corn stover, 5 lbs.	2.95	0.07	1.56	0.03
Oat straw, 10 lbs.	8.85	0.10	4.26	0.09
Oil cake, ½ lb.	0.45	0.15	0.16	0.03
Total	16.61	0.70	7.94	0.24

This ration is rather low in dry matter, but the deficiency is partly made up in the constituents contained in the different feeds. Corn stover is not a common feed with us, but 3 lbs. of corn fodder (stalks, leaves and cobs, if any) would about equal the amount mentioned in feed constituents. This reduction of approximately 2 lbs. of dry could be made up with straw. Another maintenance ration, quite as serviceable, is composed of corn stover, 14 lbs.; oat straw, 10 lbs.; cottonseed meal, ½ lb. It should be understood that animals can be maintained on roughage alone, but the feeding of a small amount of concentrates will often save more than its value of hay, straw, corn stover or corn fodder.

Another class of cattle are commonly fed in such a way that slight gains are made all winter. They are then in splendid condition to go out on grass and finish early in the season. Perhaps the cheapest way to accomplish this end during the coming feeding season is to feed largely on cut straw and silage, mixed, for the first two months, with, perhaps, a small feed of hay daily. During February and March the addition of a little bran and cottonseed meal or oil cake, say up to 2 or 3 lbs., will show results, and later the ration can be strengthened with a pound or two of chop. If the silage still holds out the bran can be dropped when the chop is added. Some successful cattle feeders never go above 2 lbs. of concentrates for their steers to be finished on grass, but they usually start to feed it early in the season. The cottonseed meal, oil cake, or bran tend to balance up an otherwise wide ration. They are commonly fed by successful cattlemen in this country.

Considerable feed is required to fatten steers properly. If one has not the stores at hand and will not buy, it will be more economical and satisfactory to finish on grass, for a half-fitted, stall-fed bullock is sure to command only a moderate price. When feeder cattle go into the feed lot do not burn them out with grain the first thing. Fill them up with roughage, preferably some kind that has a laxative effect like silage or roots, mixed with cut straw. After a time start them with a pound of grain, or less daily, and gradually work up to 8 or 9 pounds by the first or middle of March. Ordinarily it is wise to conserve the hay for spring feeding, but circumstances this season may warrant feeding it from the first. If silage and roots are short use some bran for the laxative effect. Oil cake is also somewhat loosening and has a high protein content which tends to balance a ration of silage, roots and straw. Eight or nine pounds of grain daily are usually ample during the heaviest feeding. Watch and know the animals individually and feed them according to their requirements.

Breeding Cows and Young Stock.

It will never pay to skimp the breeding cows or growing stock. Good hay, some straw and silage with a little chop, bran or oil cake is a suitable ration for the dry cows; while those in milk, of beef type, should have their allowance increased in proportion to the demands upon their systems. Keep them thrifty and if bran is required to do so, it will pay to buy it. Some of the foregoing rations may be modified to suit this class of stock, which should be properly fed to insure future production and a strong herd.

For the young stuff there is nothing better than a ration composed of hay, roots and chop containing some bran. Silage is also good, but we favor roots, when available, for well-grown calves. As yearlings, straw and silage must be used largely for good and economical results. There will be considerable hay fed this year, and in some instances the rations will be very meagre. However, yearlings should not be allowed to lose weight this winter even under the most scanty circumstances, for upon them we must depend for feeders during the winter of 1917-18.

Only a few rations have been mentioned. Every stockman will be obliged to feed according to his stores and ready cash. Succulency is very important, and if silage or roots are not to be had, bran is the next best substitute. Variety is also worthy of much consideration. Even when roughages make up the bulk of the allowance, mix as many as possible or feed them together, rather than separately until one is exhausted. All animals, humans included, require some kind of a balance between the protein and carbohydrates and fats. Fill cattle to be fattened with some form of laxative roughage at first. Then introduce the grain slowly and gradually increase it.