

the food that are digestible, yet do not contain any albumen, or muscle-making food. This will include the fats and carbohydrates as distinguished from the protein. The statement in the tag means that 33.26 pounds of the albuminoids in every 100 are digestible, while 5.87 pounds cannot be digested. The fats are worth more than the carbohydrates for feeding. How much more? Careful experiment puts the ratio at 2.2-5—that is, a pound of fat is worth as much as 2.2-5 pounds of carbohydrates. To make the table on the tag the pounds of digestible fat were multiplied by 2.2-5, and added to the pounds of digestible carbohydrates. This gives 67.11, and, as expressed above, is a ratio to confuse many farmers. "Nutritive ratio" means the ratio of the muscle-making food to that which makes fat. As in this case, there is twice as much of the latter, this ratio is called 1 to 2. To make a good ration for a milch cow there ought to be about one part muscle-making to five of the other, so you can see why hay, stalks or some less concentrated food must be added to the meal.

Those who use fertilizers understand that nitrogen, potash and phosphoric acid are valued at certain prices per pound. These prices are determined by the trade values of different substances on the market. There is a movement on foot to adopt the same basis for valuing foods. At the New Jersey Experiment Station a mixture was made of equal parts of all feeds in general use. The exact value of a pound of this mixture was found by figuring out the average prices of each separate food. Then it was analyzed and a fair basis made for the price of fat, protein and carbohydrates. This figuring gave the following result—showing the average cost per pound:

Crude fat.....	5.91 cents
Crude protein.....	0.91
Carbohydrates, including fiber...	1.12

These prices are nearly as accurate as the prices given for estimating chemical fertilizers. Applying them to the analysis given above would give a valuation of \$36.40. Now this figure simply represents the comparative market value of this meal as compared with other grains. The feeding value must include other things—the effect of the food on milk or butter, for example. Corn meal for example, gives a hard, firm butter, while linseed gives a softer product. This effect is a part of the "feeding value" in one sense, yet as regards the actual amount of nutriment in the grains, this method of finding trade valuation is pretty reliable.

The following figures given by Prof. Voorhees will give an idea of the way food prices and values vary in New Jersey:

	Cost per pound.	Selling price.	Valuation.
	Protein	Fat	Carbohydrates per ton per ton
Buckwheat			
bran.....	0.47	3.05	\$12.00
Wheat bran. 0.75	5.52	1.05	21.06
Ground oats. 0.92	5.97	1.13	24.25
Corn meal... 1.03	6.68	1.27	25.88
Wheat			
middlings. 1.03	6.68	1.27	25.50
Rye feed.... 1.39	9.02	1.71	31.50

These are but samples of well-known feeds. They simply show that any general attempt to sell grain, like

fertilizers, by analysis, will result in an upsetting of prices—reduce the selling price of some feeds and increase that of others. It will also be easier for the farmer to estimate the value of what he is buying, and will lead to greater care and accuracy all around. There is surely a great difference between the price of protein in buckwheat bran and in rye feed. The table also illustrates why ground corn or oats command a higher price than the actual chemical composition would warrant. It is because of special values they possess, like that of giving "spirit" to horses or making a firm, hard butter. The whole thing is an interesting subject, and should be developed by our stations. As to cream gluten meal, it is a strong and reasonably cheap food—better for milk than for butter. (Rural N. Yorker.)

EXERCISE vs. CONFINEMENT.

ED. HOARD'S DAIRYMAN. -- How would it do to call a halt in the wild advocacy of "no exercise" and give more of intelligent consideration to possible results to succeeding generations of cows so treated? Possibly some modification of the extreme may be developed, a middle ground, safer and better suited to all sorts and conditions of dairyman.

Mr. John Gould compares the shelter of a cornstalk, of "general western conditions," with that provided for (ex) vice-president Morton's herd, and shrieks his ghoulish glee at the supposed rout of his opponents. As well compare Mr. Morton's treatment with that received by cows in a stable I saw last winter. Warm? Oh, yes. Ventilated? Oh no. "It costs money for feed to keep up animal heat." Cows cleaned? Oh yes, in the spring when all the hair came off on hips and half their sides. Because a man favors exercise with intelligent restrictions, is no reason why he should be swept by a blizzard in a tangle of barb-wire fence and cornstalks into a Colorado canon and buried beneath an everlasting snow-drift; nor because editor Hoard and John Gould favor housing in admirably conditioned stables, should they be confined in a low-ceiled, filthy stable, having no ventilation, with a lot of never-cleaned cows, in a foul atmosphere breathed and rebreathed thousands of times, and forced to grasp their noses till death ends their misery and the no exercise theory at one fell swoop. Literary pyrotechnics, tragic declamations, arms flying à la windmill, with contortions and grimaces that carry one in spirit to a circus or a theatre, are not argument one way or another.

Now, comes Mr. King with the logical conclusion that "a cow needs no more exercise from May to November than from November to May," and "in a very few years the successful dairymen will stable their cows the year round," a result devoutly to be hoped will never be reached. It may be possible to so treat cows that they will transmit to their offspring an adaptability to such methods, but I doubt it. What with the skill required to counteract the tendencies to abortion, indigestion and their long train of attendant ills, the weakened vitality of calves, that take a degree of care and knowledge to overcome that comparatively few can acquire, are difficulties which will prevent the adoption of such a course, as a rule, by the mass of dairy farmers. Jersey breeders tried it with their *pets* and we know the howl that resulted, not without

some foundation, of "weak constitution," "tuberculosis," etc., etc., raised by admirers of other breeds. I have personally known of eighty-five per cent of the calves and three or four cows dying in one year from a herd of something over one hundred and thirty cows, and a paralyzing fright of *pleuro-pneumonia*, as a direct result of injudicious housing. Better sanitary conditions and improved methods in the supply of sunshine, fresh air and exercise reduced the mortality to less than ten per cent of the calves the following year.

The average dairyman whose living and home depend upon the profits of his business, cannot any better afford to follow the fads of the wealthy, who adopt a fancy way of dairying as a diversion, from which no profits are expected, and for which they are willing to pay, than they can to give their cattle the warm shelter of a barb-wire fence or a cornstalk.

Would it not be well to get out of this realm of extravagant hyperbole and in plain, straight-forward terms direct the intelligent, humane dairyman to a middle ground between the two extremes. I am confident from my experience there is such a position and that it is the most profitable one, and shows how to combine fresh air, sunshine and exercise with clean, warm, ventilated stables and gentle treatment; shows how to couple fresh, luxuriant pasturage at night with succulent oilage or ensilage; cool, darkened stables and freedom from flies in the day time; in a manner that will secure at once the health and comfort of the cows, strong constitutions in their progeny, and increased size of the creamery or cheese factory check for the month's product.

DRYING OFF COWS.

I think if Mr. Gardner would keep his cows from grass and succulent food, giving them only dry hay with just sufficient linseed meal to keep them from becoming too costive, and half milk them each time for a few days, then once a day, he will find no insurmountable difficulty in drying them off. I have not. (1)

Detroit. GEO. T. VAN NORMAN.

The Garden and Orchard.

HORTICULTURAL NOTES.

Keep the soil moist and cool by cultivating often and thoroughly.

Give the sprouts from fruit and ornamental trees the same attention that you give to the weeds.

Electrified earth is the latest device for attempting to hasten the germination of and the growth of seeds.

Keep the garden busy growing useful crops; always have the ground occupied, otherwise it will be occupied with weeds.

When a young orchard is set out in a stiff sod and left to live or die, the most wonderful thing about it is that some of the trees will survive this treatment and live to bear several crops of fruit before succumbing to such gross negligence.

A cheap hand-weeder, which works splendidly, may be made by grinding an old case-knife on both sides and then bending the blade about two inches from the point.

When the farmer goes to his friends

(1) Very good.—Ed.

in the town and sees the trim rows of strawberry and raspberry plants loaded with berries, he begins to feel how foolish he was to depend for his supply upon the crops which grow in the fence corners. One row of good bushes is worth all the wild ones on a hundred acres. Every farmer should have a good assortment of small fruits for the use of his family.

The failure of fruit crops is as often due to the carelessness of the farmer as to bad season. Too many growers expect to raise fruit without working for it. A fruit farm will not run itself any more than any other business. Good culture, good pruning and the destruction of insect pests are necessary, so also is the application of some plant food; the average cultivator is slow to learn what amount of manure a bit of land pushed to its utmost will absorb. The market gardener is the man who best understands this, and he furnishes an object lesson that his neighbors can well afford to study.

The man who desires fruit should keep his trees healthy and vigorous, but to do this something must be done besides keeping them in grass, a crop of hay being taken off the land each year. A good plan is to pasture the orchard with sheep or pigs, for they will return the manure to the orchard and pick up all fallen apples, thus destroying the worms; but a better plan is to keep the soil cultivated, thus allowing the air to have access to the roots, keeping the soil moist in the droughts of summer.

Bagging of grapes, as a means of protecting them from birds, insects and rots, is steadily growing in popular favor. L. Miller gives his opinion in *American Gardening* as follows:—"The bagging of grapes at the proper time is a sure preventative of the rot; those that have failed must have made some mistake in their work. This practice is advisable on account of birds and insects, for they can so demoralize an acre of grapes that one cannot get sound bunches enough to make a fair exhibition of. All this can be prevented by bagging." He said he lost ninety per cent. of the grapes not bagged at the proper time. Begin operations just as soon as the fruit is set, no matter what the variety; if done sooner there is danger of imperfect pollination.

Few persons are aware to what alarming extent the borers are infesting the orchards in the different sections of the country. A tree becomes unhealthy and eventually dwindles and dies, often without the owner having the least suspicion of the true cause—the gnawing worm within. The young, smooth barked trees are the most liable to damage from this cause, and, unless closely looked after, much damage may be done to them. There are two distinct species of the borer. Of these the most injurious, the round-headed borer, takes three years to mature, and is the larva of the striped *Laperda*, which lays its eggs at the collar of the tree, and the flat-headed borer which infests the limbs and the upper parts of the trunk. The beetles of both species lay their eggs about the same time—the last of June. Common kerosene emulsion or some alkaline wash applied to the trunk and limbs of the trees is very repulsive to this insect, and the female will not lay her eggs upon trees protected in this way. The orchard should be carefully examined several times during the season, and wherever the red sawdust exudes from the trunk of the tree a grub will be found. The little grubs which were hatched from eggs last year will be found actively at work now, and as they have not entered the sap-wood