This explains certain peculiarities which have often been noticed. For example, in such places as the neighbourhood of houses bordering on or inclosed in the forest, the small areas of coppice which have to bear the exercise of rights appertaining to proximity, such as the passing to and fro of the inhabitants and their cattle and carts, invasions of poultry, &c., the same symptoms of languishing vegetation are observable. In every case it is less vigorous than in the adjoining forest, the stems are smaller, covered with lichens and with a feeble crown. We have the same phenomena in those parts of the forest which are nearest to villages where grazing is heaviest, and this notwithstanding the fact that here, as in other parts of the forest, grazing is prohibited, the coppice is 10 or 12 years old, and that the dead leaves are not removed. It is simply that the surface covering of the soil is constantly being disturbed, kicked up and scattered about by the passing and repassing of men and cattle, and moving about is easy in these crops where the undergrowth is scarce. The result is no rotting or production of moulds, and at the same time little nitrogen and little vigour.

FEEDING STUFFS—THEIR COMPOSITION AND CHARACTERISTICS.

These are concentrated forms of fodder, whose value depends upon their albuminoid matter, oil, and carbo-hydrates (such as starch and sugar).

Linseed (seed of *Linum usitatissimum*, common Flax).—Bombay seed large and pale; Baltic seed smaller and dark brown, more liable to impurities than Bombay seed; should be crushed and plotted before feeding. Useful in calf fodders, also for milk-giving, and in the last stage of masting. Quantity, 1 to 3 lb. per 1000 lb. L. W.*

Linseed cake.—Much approved feeding cake; merits well known. Home-made cake usually softer and more oily than foreign. Very hard-pressed cake is low in oil, and not so easily eaten and digested. Linseed cakes usually impure. Chief impurities: locust beans added to give flavour and relish, rape seed, less frequently chaff, and weed-seeds from badly-screened seed. Should be broken to small pieces before feeding. Quantity, 2 to 6 lb. per 1000 lb. L. W.

Rape-cake (seed of *Brassica napus* and *B. campestris*).—It has a greenish-mottled appearance and a bitter taste, which renders it distasteful to cattle at first. Should be given in small quantity to begin with. Not suited for calves. When given to milch cows, the quantity should not exceed 2 or 3 lb. per head per day, or it will give a disagreeable taste to milk and butter. Sometimes very impure. A dangerous impurity is mustard seed. May be detected by steeping in cold water for some hours, and noting smell of mustard. Danger may be avoided by steeping the ground cake in boiling water.

Poppy cake (seed of *Papaver Somniferum*).—Contains a savoury and easily-digestible oil. May be fed to cattle in considerable quantity—5 to 8 lb. per head per day. More than 5 lb. per head per day to milch cows detracts from flavour of butter.

Hemp cake (seed of *Cannabis sativa*).—Not much used for feeding. Not so digestible as the above, owing to abundance of woody fibre (25 per cent). Fed chiefly to horses and sheep. To milch cows not more than 1 lb. per head per day. Apt to grow mouldy in summer.

Sunflower cake (seed of *Helianthus annuus*).—Relished by stock, and well-digested.

Cotton cake (seed of *Gossypium hirsutum*, &c). Undecorticated.—Best quality from Egyptian and Sea Island seed. Inferior qualities are woolly, and to be avoided. Husk has astringent properties, and is a good cure for scour. Should be ground to the size of linseed. Not very digestible, owing to abundance of woody fibre (28 per cent). Should be used freshly made, because liable to mould on keeping. Decorticated—viz., cotton cake deprived of the husk. A very concentrated and powerful bye-fodder. Should be given with caution, crushed fine, and mixed with Indian corn, oats, or other farinaceous food. Large quantity is injurious, and may even be fatal, very variable in composition. Frequently very hard pressed, and therefore indigestible. When freshly-made, softly pressed, and of good quality, it is a valuable bye-fodder. Oil very bland and digestible; used to adulterate olive oil.

Gingelly or Sesame cake (seed of *Sesamum orientale*).—Seed imported from India. Excellent bye-fodder, easily digested, much relished by all kinds of stock. Favourable for milk giving, and also for masting. Oil bland and digestible, and much in favour for making margarine.

Rice meal (seed of *Oryza sativa*).—The meal is a bye-product obtained in preparing rice for the market. A very good, safe, and acceptable fodder, but less concentrated than ordinary oil cakes. Varies very much in quality, and frequently adulterated with meal derived from rice husks. Much relished by stock, and useful for milch cows as well as for fattening animals.

Rye meal.—Is the bran of rye, and rather more concentrated than wheat bran. It is very good fodder for cattle and sheep, but not for horses.

Palm kernel or Coconut cake.—An excellent, palatable, and easily-digested bye-fodder. Especially good for milch cows. Increases the proportion of fat in milk. Puts a finish upon flattening stock. When ground to powder and most of the oil extracted, it is sold as palm kernel meal, a much-relished and digestible bye-fodder. A useful addition to calf-meals.

Earth-nut or Ground-nut cake.—The pressed seed of a leguminous plant (*Arachis hppogeoa*). The most concentrated of all cakes, containing from 45 to 50 per cent albumen and 6 to 9 per cent of oil. It is very palatable and digestible. A nutritious fodder when given in moderation. Apt to be contaminated with hair, and liable to rot on keeping if badly made.

Locust Beans, Carob Bean—A sugary fodder, most palatable and acceptable to all kinds of stock. Used to mix with oil cakes and meals, so as to improve their flavour.

Dried Grains.—The draff from distilleries and breweries dried so as to contain only about 10 per cent water. It is a first-class feeding-stuff if of good quality, but the qualities differ considerably.

* L. W.=live-weight.

The following is the average composition of genuine cakes and meals in common use :—

	Albuminoid.	Oil.	Carbohydrates.
Linseed	21	37	20
Linseed cake	29	11	32
Rape cake	31	10	30
Poppy cake	35	10	22
Hemp cake	30	8½	17
Sunflower cake ..	33	9	27
Cotton cake	28	7½	30
„ (decorticated)	44	15	20
Gingelly cake ..	37	13	21
Rice meal	11	10	50
Rye meal	14½	3½	60
Palm kernel cake ..	17	10	41
Palm kernel meal ..	19	3½	44
Earth-nut cake (shelled) ..	47	7½	25
Locust bean meal ..	4	2	74
Dried grains	20	8	50
Bran	13½	3½	56

THE LACTOMETER IN ITS TRUE LIGHT.

The lactometer, or lactodensimeter, as it has been called, to distinguish it from another simple instrument, the creamometer, was at one time a great favourite. In France, a few years ago, if not indeed now, the Police would take action at once on a reading of that instrument, and turn milk out into the gutter if it were condemned. And in London, the lactometer is exposed for sale in shop windows, and both the public and milk dealers trust to it. Even in some recent manuals intended for the guidance of medical officers of health, the use of the lactometer is recommended. In one of them in particular—Dr. Edward Smith's—which claims a sort of pseudo-government sanction, the lactometer is very prominently put forward, and commended as being for milk what the hydrometer is for alcoholic fluids.

But, although it is so very popular, and although it has been so implicity trusted, the lactometer is a most untrustworthy instrument. There hardly ever was an instrument which has so utterly failed as the lactometer. It confounds together milk which is exceptionally rich, with milk which has been largely watered; and many a poor French peasant, bringing the best and unadulterated produce of his dairy into a French town, has been ruthlessly stopped by the Police, who have dipped their lactometer into the milk, and forthwith sent it down the gutter as if it had been milk and water.

Very curious things, too, are done in this country by reason of trust in the lactometer. There is a prison not far from London, and the prison authorities are specially particular about their supply of milk. They allow no milk to enter the prison unless it comes up to the M. mark on a certain lactometer. The M. mark is pitched very high, and the milk purveyor reaches the M. mark by skimming the milk.

A very little consideration will suffice to make intelligible the obliquity of the indications of the lactometer, and to show how untrustworthy it must be. The lactometer, as, of course, will be understood, is simply the hydrometer applied to milk; and readings of the instrument are neither more nor less than specific gravities. The more milk-sugar and caseine and mineral matter there is in a given specimen of milk, the greater (other things being equal) will be its density or specific gravity, and the higher the lactometer reading.

If, however, fat globules (as happens in the instance of milk) be diffused through the fluid, then, because fat is lighter than water, the effect of the other milk-solids on the gravity of the liquid will be more or less neutralized. The density of milk-fat is about 0·9 water being 1·0. Now, if a solution of caseine and milk-sugar, of specific gravity 1·030, be sufficiently charged with fat globules, its specific gravity may be sent down even below the gravity of water. How much would be required to bring about such a result is a matter of simple calculation.

This being understood, it will be obvious that if the specimens of milk differ in specific gravity, there must be two distinct and equally valid ways of accounting for the difference. The milk with the lower gravity may be milk let down with water, or let down with fat, *i.e.*, milk let down by being enriched.

By way of example, I would just refer to the specific gravity of the so-called strippings, which are the last portions of milk wrung out of the udder at the termination of the milking. These are richer in cream than the average mass of the milk, and they have a much lower density than average milk.

I have myself examined strippings with a specific gravity of 1·020, and a specific gravity of 1·025 is by no means uncommon. In the instance of stippings of the latter gravity, I found the percentage of solids to be 18·74.

Now, if all we knew concerning a sample of milk was that its gravity was 1·025, we might with equal reasonableness conclude, either that it contained fifteen or twenty per cent. of extraneous water, or that it was surcharged with cream.

If, by adding fat to milk, the specific gravity is lowered, it follows that by substracting fat (*i.e.*, by skimming) the specific gravity is raised; and hence the explanation of the reaching of the high M. mark by skimming.

A certain trick of the milk trade is fostered by the employment of the lactometer. The milk is partially denuded of cream (accomplished conveniently by adding a certain quantity of skimmed milk to the fresh milk), and thereby raised in gravity. That being accomplished, it is dosed with water, and its gravity is thereby lowered to the normal standard.

Let no one think that he would discover such a trick by making an estimation of cream; for watered milk throws up its fat in the form of cream more perfectly than unwatered milk.

Another objection relative to the lactometer (which, however, pertains to the application of the hydrometer to organic fluids generally) is drawn from the circumstance that a comparatively small change in density corresponds to a great change in composition. Making total abstraction of the difficulty and uncertainty dependent on the cream, and regarding milk as a solution of caseine and milk-sugar, it will be seen that whereas the specific gravity of water rises only from 1·000 to 1·032 in passing into milk, the water