



Left.—A thatched hay stack with the thatch held down by ropes made of hay. Right.—Two round stacks, the near one with its cover off.

gered stakes at intervals inside them. Horses take more readily to hay placed in racks. These can be made over the feed boxes in the stables or in the open in the field.

**Composition of Hay**

Hay is valuable as a fodder because it supplies bulk which not only nourishes the animal but fills its digestive organs and makes it feel comfortable. Green grass contains 70 to 75 per cent. of water, while hay contains 15 to 20 per cent. of water. Hay harvested with no rain to interfere with curing operations loses about 10 per cent. of its dry matter during curing and 16 per cent. in the stack, a total loss of 26 per cent. of dry matter.

Hay subjected to bleaching by rain will lose much more dry matter, and that which it loses will be the more easily digestible and therefore the more valuable food in the hay. Hay contains much indigestible fibre, much digestible carbohydrates, very little oil, and a fair proportion of ash, containing much silica. It contains a fair amount of protein.

The loss in hay made during good weather is due to the continued respiration of the grasses and clovers after cutting. The cells in these plants do not die immediately after cutting, but go on breathing for some time. This respiration results in the loss of plant food. The aim, then, in curing hay is to dry the grass and clover quickly so that respiration is stopped at an early stage. Unfortunately, loss of dry matter is continued after the death of the cells by enzymes and by bacteria, giving rise to fermentation and commonly causing loss of food in the stack.

**Variation Factors**

The composition of hay is affected by its botanical components. Broadly

speaking, the more clover the hay contains the higher is its content of protein and the lower its content of indigestible fibre.

Secondly, the date of cutting affects

ference, not only the loss in composition, but also the loss in digestibility, between hay dried carefully under artificial conditions and that made in the field in the normal way:—

	Dried Artificially.		Made in the Field.	
	Composition. Per Cent.	Digestible. Per Cent.	Composition. Per Cent.	Digestible. Per Cent.
Protein .....	17.0	71	14.94	67
Carbohydrate and Fat .....	43.8	66	44.22	62
Fibre .....	31.81	48	33.9	45
Ash .....	7.39	28	6.94	23
	100.00		100.00	

the composition. After flowering time the leaf growth almost ceases, and the plants devote their attention to the transference of digestible materials from the leaves and stems to the seeds. The seeds are very liable to get lost in the process of making and saving hay, and the plants have robbed their stems and leaves in forming their seeds.

Consequently, hay which has gone to seed contains little digestible protein and carbohydrates, and has correspondingly much indigestible fibre and is poor in quality. Lastly, weather conditions affect the hay composition. Rain washes the soluble or digestible nutritive materials out of the hay, and thus diminishes its food value.

**Analysis of Hay**

The following table shows an analysis of well-made and spoilt hay:—

	Well-made Hay. Per Cent.	Spoilt Hay. Per Cent.
Water .....	16.6	20.45
Proteins .....	15.81	8.5
Carbohydrates and Fat .....	60.00	64.27
Ash .....	7.59	6.78

The chief loss is in protein, and the losses are greater than indicated because the soluble constituents are lost.

The following table shows the dif-

The analysing of hay to obtain the percentage composition is fairly easily carried out, but the work of arriving at the percentage of digestible nutrients, nutritive ration, and the starch equivalent is a somewhat costly and lengthy business, and even in Great Britain where accurate measurement of the feeding value of foodstuff is important it cannot be economically adopted to meet general requirements.

In consequence, attempts have been made to determine the approximate feeding value of hays from their chemical composition by utilising algebraical equations, but it has been found that a new equation is necessary for every different type of hay. Thus, one equation which gives good agreement with actual results when used for permanent pasture hay cut at an advanced stage of growth will not be suitable for hay cut from new pasture or lucerne or early-cut meadow hay.

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