

Haymaking.

Valentine Meacham Emmert.

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Altho the making of hay is a comparatively simple operation, yet there are numerous considerations which taken individually are perhaps of minor importance, but taken collectively are well worthy of careful investigation. In this treatise I will dwell on the theory of haymaking, not to the exclusion of the practice, but rather in its application to practice.

Time of Cutting.

While the times of cutting are almost as numerous as there are different kinds of grass, yet the general principles will apply to all of them. Generally speaking, grass contains the greatest per cent. of digestible nutrients at the period when it is just coming into bloom. At this time also the per cent. of protein is highest. As it approaches maturity the per cent. of protein gradually diminishes and the per cent.

of carbohydrates, especially the least digestible one, cellulose, increases. This fact is illustrated in the average of twelve analyses compiled by Prof. Henry as shown below.

Composition of Timothy Hay	Water	Ash	Pro- tein	Crude Fiber	Nitro- gen-free Extract	Ether Extract
Cut in full bloom	15.0	4.5	6.0	29.6	41.9	3.0
Cut when nearly ripe	14.1	3.9	5.0	31.1	43.7	2.2

This however must not be confused with the total yield per acre because with a number of grasses the increase between early bloom and maturity is very great, so that while the per cent. of digestible nutrients is less, the increased total is often sufficient inducement for leaving the grass to maturity or at least past full bloom before cutting. Bearing on this point is the following report of the Illinois Experiment Station on timothy hay.

Date	Stage of development.	Hay per acre.	Total Nutrients per Acre.				
			Protein.	Crude fiber.	Nitrogen free extract.	Ether extract.	Ash.
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
June 25	Full bloom	4,480	240	1,056	1,602	165	224
July 2	One-half anthers shed	4,320	225	1,155	1,663	152	228
July 11	Seed in dough	5,240	246	1,380	1,960	153	273
July 23	Seed nearly ripe	5,180	253	1,377	2,058	137	239

Storer says, "The strong arguments in favor of late cutting are, that much more hay can be obtained from each particular field; that the hay is more easily made, i.e. more quickly, with less labor, and at less risk; that it keeps better; and that it is excellent fodder for any kind of stock, including working horses, which thrive upon overripe timothy in spite of the small drawbacks just now alluded to. As for cows and oxen, it may be said that their powerful digestive organs are competent to utilize the seeds of timothy and the butts of overripe stalks also." For these reasons practical men usually mow late.

The difference in the feeding qualities

is quite noticable. For horses late cut hay is the best because the early cut is more laxative and apt to make them "soft". For dairy cows the early cut hay is better as it sustains the flow of milk. One early writer on the subject says that if your object is quantity of milk mow early; if your object is quality of milk mow late. Investigators along dairy lines have found that it is only as a cow is going dry that the quality of the milk is improved. These two facts taken together lead me to conclude that late cut hay has a tendency to make cows go dry.

Possible Losses.

The most digestible portions of hay are also the most soluble and to this fact is due the losses which result from having hay exposed to rain. If, however, the rain comes shortly after the hay is mown, before it has wilted to any considerable extent, the loss from this cause is reduced to a minimum.

If allowed to dry too much the leaves

become brittle and are broken off and lost in handling. Since the leaves are the best part of the hay this should be avoided if possible.

The aroma of hay, tho not a measurable quantity, is worth considerable if it can be retained. Some of this is carried off by the natural moisture of the grass, and each time that it is wet and dried more is lost. Even the dew which falls over night produces this effect.

Another possible loss is that of color. Hay exposed to the direct rays of the sun when drying has its color bleached out. There is also a chemical change connected with this. Both of these results are prejudicial to the production of the best hay.

Different Methods.

Generally speaking, one, or a combination, of the three principal schedules now to be given is followed in making hay.

1st. Mow in the morning as soon as

the dew is off: turn two or three times with the tedder if necessary, rake up and haul in the afternoon.

2d. Now after the dew is off in the morning: when wilted put into cocks and allow to sweat over night: in the forenoon open the cocks to allow the drying to continue, and haul in the afternoon.

3d. Cut late in the afternoon so that the grass will not be wilted enough by night for the dew to damage it: dry it the next day and haul in the afternoon.

Each of these methods has its good qualities. The first makes it possible to complete the operation in one day and so leaves no possibility of the hay getting wet over night. The second offers the advantage of the sweating process which, instead of drying the leaves and leaving the stem full of sap, draws the moisture from the stems and puts the hay in better condition for keeping. By the third method the grass is still green when night comes on and in this state it is very little

injured by any rain which may fall during the night and is ready for the drying process early in the morning.

In sections where the process of hay making is greatly hindered by rains it is quite common to make brown hay. This is done by putting the hay into cocks while green and allowing it to ferment until a convenient time for drying it. In the fermentation there is considerable change in composition and some loss of digestible nutrients. - alcohol, acetic acid, etc. being produced, - but the hay made by this method is palatable and the loss sustained is very much less than results from attempting to cure the hay in the ordinary way. The heat produced by the fermentation kills any spores or micro-organisms which may be present and thus the hay is kept from moulding in the mow.

Other Points.

Hot weather, even tho it be some -

what sultry is the best weather for haymaking as this hastens the transpiration of moisture from the leaves. Bright strong sunlight is less desirable because it dries up the leaves without drawing the moisture from the stems.

One of the most important advantages of curing in cocks is that the transpiration goes on gradually and the stems lose their moisture thru the leaves and the whole mass becomes equally dry. Then when the cocks are spread out it soon becomes dry enough to place in the mow.

Haycups are recommended for covering the cocks in the field but it is only in regions where there is a scarcity of hay that their use will be profitable. Their chief use is to keep rain and dew from damaging the hay.

Dew falling on hay when it is about "made" has a somewhat deleterious effect by bringing spores down from the air which cause the hay to mould

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after being stored in the mow, and by removing more of the aroma of the hay than would otherwise be lost.

The condition in respect to dryness at which hay should be placed in the mow is comparatively definite but is hard to define. It should not be completely dry but should be moist enough to pack down firmly in the mow. Quite a little of the natural moisture may be stored with it without much danger, but when it has extraneous moisture it is much more apt to mould. Some follow the practice of putting up hay while it still contains a large per cent. of moisture and putting straw in with it to absorb the moisture. The straw thus keeps the hay from getting musty and also absorbs aroma from the hay and is thus made palatable so that it is readily eaten by stock along with the hay. Others follow the practice of putting salt in with the hay to keep it from getting musty. Hay that is only half dried may be safely put in the mow if six to eight quarts of salt

are put in with each ton of hay. The salt increases the palatability of the hay.

Implements Used.

Briefly, the implements used in haymaking are as follows: - mower, rake, sidedelivery rake, sweep rake, tedder, hay-rack, loader, stacker, baler, and hay fork. The names indicate their respective uses. Some of them are unnecessary for haymaking on a small scale, and others are unnecessary when it is done on a large scale.

As a practical application of the above principles I will add a few words on making alfalfa hay.

It is generally conceded that the best time to cut alfalfa is in early blossom, say one-tenth to one-fourth the blossoms out. This gives the best hay and also leaves the field in the best condition for the succeeding crops. The following results in yield of hay and production of beef per acre were obtained in an experiment covering

five years, at the Utah Experiment Station

	Hay. Tons.	Beef. Pounds.
In first blossom	5.35	706
In full bloom.	4.90	562
Half blooms fallen	4.55	490

This shows that, while there is not a great difference in the yield per acre, the early cutting is of much greater feeding value producing 44% more beef than the late cutting on the same area.

Alfalfa is especially susceptible to losses both by exposure to rains and by shaking off of the leaves. "Hay exposed for fifteen days to three showers aggregating 1.76 inches of rainfall, contained only 11.01 per cent. of protein, while hay from the same land cut the same day, but air dried without exposure, contained 18.71 per cent. Alfalfa hay rained upon is worth about half what it would be were it unexposed."

In making alfalfa hay, mow it

and let it wilt in the swath and then rake into windrows. If using a sweep rake and stacker it may be left to cure in the windrow; otherwise it should be placed in cocks to cure. Handle as little as possible in stacking so that the leaves may be retained.

Alfalfa may be stacked when it is somewhat damp if with it are stored alternate layers of straw. In this way the straw is made palatable and becomes good feed, and the alfalfa is protected from the injurious effects of the presence of moisture.

Alfalfa will not shed water well when stacked and therefore the stacks should always be topped out with something else such as long prairie hay, or slough grass.