

Lectures
on
Agriculture

Part VII

by
Wm P Brooks, B.S.,
Professor of Agriculture
Sapporo Agricultural College,
Hokkaido,
Japan.

Paul I. Ota,
Class '81.
S. A. C.

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Supplies of Food
to Plants.

Oxygen — whether in quiet free state or in union with C as CO_2 is abundantly supplied by the atmosphere.

Carbonic Acid Gas — is also abundantly supplied by the atmosphere.

Hydrogen — is adequately supplied to crops by water which enters the plant chiefly through the roots from the soil.

Nitrogen — exists in immense quantities in the atmosphere in a free state, which is doubtless the primary source of the N of the organic world; but in this form, it is not directly available. Its assimilable compounds, NH_3 and HNO_3 are not present in sufficient quantity.

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Assimilation of Atmospheric Food.

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It has been suggested

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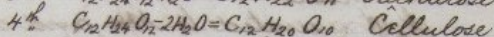
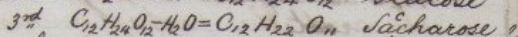
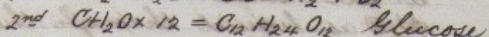
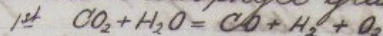
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1st CO_2 taken in by the plant
under the influence of sun-
light loses $\frac{1}{2}$ of its O and the
 H_2O all of its O. This leaves
 CH_2O which are supposed to be
retained in plants while O_2
is exhaled by plants.

2^d 12 times CH_2O gives us glu-
cose.

3^d Less one equivalent of water
from (2nd) leaves saccharose.

4th Less two parts of water, we
obtain cellulose.

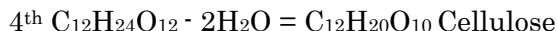
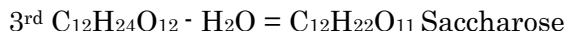
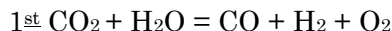
Table.

1. Absorbed by Plants.

O by roots, flowers, ripening fruits
and all growing parts.

CO_2 by foliage and green parts.

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Table.

1. Absorbed by Plants.

O by roots, flowers, ripening fruits and all
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CO_2 by foliage and green parts, but only in the
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but only in the light.
 NH_4CO_3 by foliage probably
 at all times.
 H_2O as liquid through the
 roots.

N_2O } united to NH_4 and dis-
 NH_4CO_3 } solved in H_2O through
 the roots.

Ozone } uncertain
 CH_4 }

2. Not Absorbed
 by Plants.

N
 H_2O in the state of vapor.

3. Exhaled
 by Plants.

O } by foliage and green
 Ozone } leaves parts, but only
 in the light.

CH_4 in traces by aquatic
 plants.

H_2O as vapor through the surface
 of plants at all
 times.

CO_2 from the growing parts
 at any all times.

NH_4CO_3 by foliage probably at all times.

H_2O as liquid through the roots.

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 NH_4CO_3 the roots.

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 Ozone light.

CH_4 in traces by aquatic plants.

H_2O as vapor through the surface of plants at all
 times.

CO_2 from the growing parts at all times.

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The Physical Relations
of the Atmosphere to
Plant Growth.

That the atmosphere is a mixture of gases — and not a chemical compound — I have already stated. Truth of this statement is evident from the fact that its composition varies, though this variation is within very limited extent. This is so little because of the remarkable balance maintained by nature between growth and decay life and death. All gases have a remarkable property of diffusion. If two gases be placed in any confined space, they will soon become evenly distributed throughout that space. When gases pass through a membrane (the pores) in which are not discoverable by optical means, in order to become evenly distributed, the process is called osmose.

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Gaseous osmose, therefore, is simply diffusion modified by the influence of the membrane. Gases are absorbed by plants through their membranes by osmose, and those portions of the atmosphere which are in contact with the plant are soon robbed of their content of these gases which are available as plant food. Were it ^{not} for the property of diffusion possessed by all gases, the amount of atmospheric plant food obtainable by plants must be very small, since the percent of such substances as CO_2 and NH_4 in the air is quite small. Since all gases, however, are governed by the laws of diffusion, the NH_4 and CO_2 of the atmosphere must be constantly flowing toward the plant in order to supply the air surrounding it with the proper amount.

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Farm Economy

Webster's ~~and~~ definition of the word economy is "management without loss or waste." Another good definition is "a system by which business is carried on without loss or waste." In no other branch of business is economical management more important than in farm; for in no other business are there ^{so} many ways in which it is easy to incur loss.

System Necessary to Prevent Loss or Waste.

In order to succeed in any business, it is absolutely necessary to prevent loss and waste; and in order to do this, the business must be managed according to some regular system. From the nature of agri-

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From the nature of agriculture,

culture, it is more important to manage economically than in almost any other business; and yet owing to circumstances, it is more difficult to lay down and adhere to a system of farm operations than it is in any other business.

1st In all farming operations we are greatly dependent on the weather over which we have no control. That man, indeed, is wise who can with reasonable accuracy foretell what the weather is likely to be. By the weather, the daily plans of farmers are often broken and their men are left without employment unless storms and interruptions are included in their system when they have merely to change the kind of work.

2nd Upon the farm, there is so little division of labor. For these reasons, a system

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For these reasons, a system

of farming should embrace all possible contingencies. A well contrived system firmly adhered to, is essential to success, and is the first step towards securing farm economy. Farmer's system should embrace general plans of farm work and contemplated improvements for several years in advance as well as more minute plans of the work from year to year, from month to month, and from day to day.

Economy in Re- gard to Soil.

The man who killed the goose which laid the golden egg, is on a par with the man who ^{permits} land, allows it to deteriorate. If the farmer allows his farm to grow poorer, he is losing his capital. Land is not

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Economy in Regard
to Manures.

Manure may be considered to be the raw material which the farmer wishes to manufacture into crops; and since his income depends upon the quantity of crops raised, if he wastes his manure he is losing its income. All wastes from improper management or application should be prevented.

Economy in Regard
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It is even worse, if possible, to waste crops than to waste manure, since the manufactured article is worth more than the raw material. It is estimated that individual carelessness or want of fore-sight or intelligence annually wastes millions of dollars worth of crops in America. Crops are wasted in the field by improper modes of harvesting and in the barn by improper feeding or storage. Much money is yearly lost by harvesting crops at the wrong time. If, for example, the harvesting of a grain crop is deferred a few days beyond the proper time, much grain will rattle out and be lost. By careless handling, too, much grain is shaken out and lost. It requires but ^{little} additional labor to so manage as to avoid such loss. Much value is also

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frequently lost by harvesting hay crop too late. To allow grass to stand until the seed is ripe, is poor economy for two reasons: — 1st because it is not as good for hay not containing as much digestible matter; and 2^d because a crop of grass the seed of which is allowed to ripen, much more rapidly exhausts the soil than one cut before the seed is formed.

Crop, improperly stored very often decays or moulds thus causing very great loss.

Careless feeding of crop is also a fruitful source of loss. It should be your aim to put before animals no more food than they will eat, since if you give them a larger quantity than this, they will trample it under their feet and destroy it.

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Economy with Respect
to the Growth of Weeds.

[This topic should well be remembered by every practical farmer.]

Until the seeds of weeds become more valuable than they are now, we cannot let them grow on our farms. If one crop of weed-seeds is allowed to ripen, it will ^{not} all germinate for a great number of years, and so, the man who lets weeds grow to seed is laying trouble for himself for many years to come. Most kinds of weeds produce an immense number of seeds and many of the latter are provided with contrivances which make their distribution by wind or other means very easy. For this reason, no weeds should be allowed to grow along by fences, ditches or the borders of

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The Performance of
Work at the Proper
Time, as Affecting
Farm Economy

All kinds of farm work, especially those connected with the planting, cultivating and harvesting of crops, must be done at a certain time or else great loss will result. If, for example, a crop is planted a little too late, it may not have sufficient time to ripen, and the result will be a great loss. If a crop is not cultivated at the proper time there is a great loss in two ways: — 1st because it is much more work to cultivate

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it after the weeds have become larger than it is when they are small, and 2^d because the growth of large weeds will seriously injure the growing crop. One week's delay beyond the proper time for ^{cultiva}harvesting a crop often necessitates the expenditure of ten times as much labor to clear the land of weeds as would be required had the work been done at the proper time. I have already called the attention to the fact that much loss would often result from not harvesting crops at the proper time.

Economy in Regard to Labor

At almost all times and in almost all places, labor is the greatest expense in raising crops, and therefore, it should

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It goes to mill, store, blacksmith's
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Men, working for a poor
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in a distant field, and getting there, he will find that he must go back for his whetstone. By the time he reaches his field with the whetstone, he will have become thirsty and he must get ^{back} for his water: and he may work hard half of the morning and yet not cut much grass. A man, to succeed in farming, must utilize all his working force.

Economy in Regard to Teams and Stock

Many of the animals used on a farm, form a part of farm stock; that is, they are valuable not only because of their work but also because of their growth. Such animals as oxen, for example, should be regarded as valuable both for their labor and growth. For this reason, such animals should

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be so fed and cared for that they will pay for their food in improvement, in which case, their work will be a clear gain. It is also very poor economy to so feed and overwork animals which are kept simply for their labor, that they will deteriorate in value. Well fed animals can perform much more work than those poorly fed, but they should never be obliged to perform so much labor as to become very poor. A certain amount of work will keep them in a better condition than they would be without it. Animals which are poorly fed or which are obliged to do so much work as to become little else than skin and bones, very rapidly deteriorate in value and will last but very few years. It should be the farmer's aim, then, to feed his working animals

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well and to oblige them only to do so much work as they can do and still keep in good condition. It is poor economy to so manage any stock that they will barely hold their own and not gain. By so doing, you lose nearly all the food you gave them, all you have to show for the food they have eaten, is a pile of very poor manure, whereas had you given them a little more food, they would have continued to grow, and by this growth would have paid for the food you have given them. Animals which by neglect or poor feeding, have at any part of their lives, been stunted, can never, though fed ever so well, be made to grow as well as they would had they never been stunted. It should be the aim of the farmer to so feed all his animals as to keep them growing

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Good tools and machines and plenty of them are necessary on the farm. Good implements and machines are consistent with the most rigid

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economy, since with their assistance, a man can accomplish much more labor than he can perform with clumsy implements.

A man cannot afford, in general, to borrow especially smaller tools and implements, since it often takes more time to go and borrow an implement than it would take with properly directed labor to earn money enough to buy it.

Economy demands that all tools and implements should be in perfect order and that all there should be a place for every thing, and that everything should be kept in its place, where not in use.

Economy also demands that everything should be protected from the weather both in summer and in winter, since implements exposed to the influence of weather are very much injured by it. The wooden parts of machines and

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tools will decay, and the iron or steel parts will rust so that those articles exposed to the influence of weather will not last nearly as long as those which are always protected from it.

A very good plan to be pursued by the farmer who employs several men to work for him, would be to have a complete set of farm tools for each man. Then, when the farmer hires a man, he should charge him with these tools and when a laborer is discharged, he should be credited with what tools he has in good condition at the same price he was charged for them. The prices of those tools which he has lost or broken, should be deducted from his wages. The laborer should be told when he is first employed that such would

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be the case. This would lead him to take excellent care of all his tools and therefore though this course would oblige the farmer to have more tools than the course ordinarily pursued, it would doubtless prove the best economy in the end.

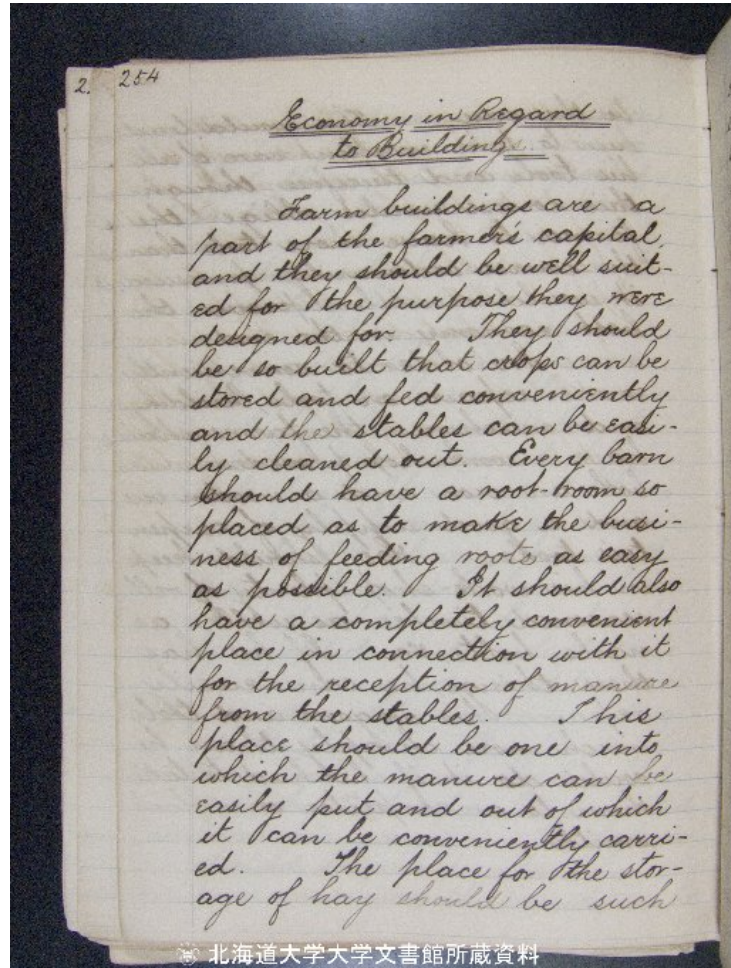
In order to conveniently make repairs on tools, buildings and machines, the farmer should have a work-shop provided with both an iron and a wooden vice and a good supply of carpenter's tools. He should keep in his work-shop plenty of well-seasoned timber as well as nails, bolts, &c. If he has these things, he can easily repair his wagons and tools much more cheaply than he could do it, if he had to take them to a carpenter or a blacksmith.

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Economy in Regard
to Buildings.

Farm buildings are a part of the farmer's capital and they should be well suited for the purpose they were designed for. They should be so built that crops can be stored and fed conveniently and the stables can be easily cleaned out. Every barn should have a root-room so placed as to make the business of feeding roots as easy as possible. It should also have a completely convenient place in connection with it for the reception of manure from the stables. This place should be one into which the manure can be easily put and out of which it can be conveniently carried. The place for the storage of hay should be such



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that the hay can be rapidly and easily put into it, and such that the hay can be conveniently carried out to the place where it is to be fed to the cattle. The room in which the animals are to be kept, should be well lighted and well ventilated; and the place where the animals are to lie should be so arranged that they can easily be kept clean, and at the same time, be comfortable.

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Farm Management.

It was formerly believed that a man who can do nothing might become a successful farmer; but this old idea is now about obsolete; and at present, it is a general opinion that a man to be a successful farmer, must have a particular education both practically and theoretically to fit him for his work.

To be capable of managing a farm well, a man must be familiar with the great natural powers which have reduced the rock to soil and which still influence it. He must know a difference between an agricultural soil and subsoil and what influence air and gases in it have upon the soil and also how frosts heat and waters affect it. He must know the chemical and physical

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And, he must also know the
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him to execute promptly all business operations. Farm management is simply the application and use of all this knowledge in the business of managing the soil, crops and stock amid the varied circumstances of each individual case.

The Proper Size of Farms.

You will often hear men making the statement "Ten acres is enough for a farm". Others have even said that three acres is enough. The proper size of farms, however, cannot be stated in absolute figures. It depends largely on the branch of business you intend to pursue. In market gardening ten acres would be a large farm, and even four acres would require the labor

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of about four or five men and teams to manage it properly. On the other hand, stock and grain farming each requires a great many acres.

If the work upon the farm be done thoroughly, the larger it is, the more profitable it will be for the following reasons: —

1st Because it cost less proportionally to raise crops whatever may be the branch of business.

2nd Because it costs less for oversight on a large farm; because one man of ordinary capacity can oversee and direct and direct the labor on a thousand acres of land just as easily on a small farm.

3rd Because it costs less in proportion to the crops raised for labor of both men and teams upon the large

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3rd Because it costs less in proportion to the crops raised for labor of both men and teams upon the large

farm; because if only one or two men are at work on a farm, they work at disadvantage at many kinds of farm work.

4th If a man has only twenty-five acres of land, he has to keep just as large a team as a man who has two thousand acres; because at certain times of the year, he cannot do his work unless he has such teams.

5th It also costs more, proportionally, for tools and machines on a small farm; for, the small farmer must have about as many as the large farmer must have.

6th A man, having a large quantity of anything for sale, can usually sell it more readily than a man who has but little, and in addition to this, the large farmer has the power to govern the market.

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Capitals in Farming.

Both permanent or fixed and floating capital are of great importance to farm operations. Capital invested in land which is in a growing community is the safest possible investment. It is commonly most profitable in the end though at first it may not pay a large percent.

Money invested in stock or general business, is called ^{floating} ~~perishable~~ capital. It is wise to so invest some of our money that it can be readily obtained for use at any time.

Money invested in implements and machinery, is called perishable capital. In order to keep a sufficient number of tools and machines, it is usually necessary to spend considerable

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money each year. As capital thus invested, is so perishable, it ought to pay, while in existence a large percent.

If a man has \$10,000 with which he intends to buy a farm and carry on the business of farming, he should invest only \$6-7,000 in land and buildings, and keep the rest as floating capital.

The kinds of capital enumerated, do not embrace all the capital that the farmer may have. Cost of education, whatever kind it may be, is capital and a man should be paid for the use of it.

Character is also capital. A good character may be worth many thousand dollars to a man in business, and no man can succeed without it.

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Kinds of Farming.

There are two kinds of farming; namely, general and special.

General farming is understood to be the business of raising most of the crops and kinds of stock which the section in which the farm is located, will produce.

Special is the business of raising a few special crops or kinds of stock. Sometimes, a special farmer confines himself to one or two crops. sometimes, to a single kind of stock, raising only those crops necessary to feed it. Other men who may be called special farmers, raise perhaps three or four different crops and two or three kinds of stock.

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Since the general farmer raises so many crops and so many kinds of stock, he will

2. 564
always be comparatively sure of having some crops or some kinds of stock that will prove profitable. One or two crops may fail; but others will give a good result. If one or two crops raised by the special farmer fail, he has no other upon which he can rely. The general farmer raises his own food and much of the material necessary for the manufacture of his clothing; so that, he is perfectly independent for means of subsistence. Since the general farmer produces so many crops and cares for so many kinds of stock, he cannot become very skilful in their production while the special farmer, since he confines his attention to the ^{few} of special crops, learns how to produce them

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in the most skilful and economical manner. The special farmer does not need so many implements in proportion to the amount of work he does, as the general farmer requires, and therefore this item of expense is less in proportion to the crops raised than in general farming.

Notwithstanding the many advantages of special farming, it is impossible in a new country for many of the special farmers.

Special farming can be successful only in a place where large markets are accessible. If, in Hokkaido for example, a farmer produces a very large crop of potatoes, he can find no profitable market for them. The facilities for transportation must be good or else, special farming cannot prove profitable. There must

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General Farming

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er than that on the other side of the rivers or mountains, I would take the fertile soil in preference of the colder. Other conditions being the same, however, the rules which I have given you are good ones to follow. A general farmer should have various kinds of soil so that he may have soils suitable for all kinds of crops. In selecting a farm in a new country, much can be told with regard to the fertility of the soil, by the character of vegetation growing upon it. You should always select a farm in the place where the natural vegetation is very luxurious. A growth of large trees or of such varieties of trees as elms and oaks indicates a richer soil than a growth of small stunted trees as the birch or pine.

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A growth of trees generally indicates a richer soil than a growth of grass or herbaceous plants; but, if the latter be very luxurious and vigorous, the soil may be a very excellent one. In selecting a farm in an old country, the buyer should be able to determine from its appearance as to the quality of the soil. Much can always be told by the character of the natural vegetation growing upon it. If the weeds are large and vigorous and grow close together, you may decide that the soil is rich. If on the other hand, there are but few and small weeds, you may conclude that the soil is poor. By a close inspection, you can determine whether the farm is simply (exhausted) or (neglected). It may often be good policy to

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buy a neglected farm where it would not be to buy a worn out one, unless we could buy it very cheap. We must be careful to select a farm with plenty of good spring or running water upon it, if it is possible to do so. The supply of such water should be sufficient for the use of the family and farm stock and also for irrigation, if possible. Such a supply of water will be a great saving of expense; and what is still better, it is far healthier. We should have a regard to markets in selecting a general farm, for, a convenient market is even more important to the general farmer than to the special. He usually has but small quantities of any one thing to sell; and, therefore,

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fore, he must have a convenient market. A farmer should be particular to locate his farm on a good public high way, if it is possible to do so. By this means, he saves the expense of building roads, and keeping them in repair. He should locate so as to be near schools, and where his family can have social intercourse with other people. Good rail roads are also highly important as a means of transportation. In a new country, it will not usually be possible to locate upon a rail-road. But if a farm can be so located, it will be worth much more than one located distant from the rail-road.

Ownership of Land
to be Farmed.

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It is often a question with a young man whether it will be wise for him to run in debt for a farm. Some hold the opinion that it will be wiser for him to work for some one else until he accumulates sufficient money to pay for a farm. It is a general fact that a borrower is the slave of a lender, and if a man runs in debt, he should do so only after mature deliberation. No one should ever run in debt ^{for} any personal expense; for whatever he buys, has no market value after he has used it himself. On the other hand, if a man does run in debt for a farm, he can if the purchase has been judiciously made, sell it at any time for as much as — if not more than — it costs.

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I would advice a young man to run in debt for a farm, if he has the following qualifications:—

1st If he has fully decided to follow farming as a life pursuit.

2nd If he has confidence in his own intelligence and skill to grapple with and manage the business, and

3rd If he has any experience as a managing director of the business of farming.

The advantages of owning a farm, if you are qualified to manage it, are many. If you are a man such as I have described, you will be capable of improving the farm, and if you own it, you will get all the benefit of these improvements.

The influence on a man personally of owning a farm is very great. It improves him

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for, it makes him independent, self-reliant and manly. It gives him a home and an object and incentive to labor.

The power and productive capacity of a country, the land of which is divided among many of its inhabitants will be greater than the power and productive capacity of a country otherwise similarly situated but the land of which is owned by a few individuals. For this reason, it is good policy for nations to give public lands to industrious men who will settle on them. If an immigrant comes to Hokkaido to commence farming and has enough money to start in that business, the government is really a gainer if it gives him land to

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Location of Buildings on the Farm.

In selecting a farm which has no buildings on it, you should be careful to see that there is a good location for them. Every farmer should live on his farm, since if he does not, there is a great loss of time in going to and from work, and in hauling crop and manure.

There are two fundamental rules which should govern the location of farm buildings.

1st They should be so located as to be central to the field to and from which there is to be the most cartage of manure and products.

2nd They should be so located as to be on or contiguous to a good public highway.

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way. The distance of the house from the road should never be less than 75-100 feet. The best location for your farm, then, for, since by such a location, both of the rules I have given you, are complied with, is upon the two sides of a good public road, the amount of land on each side of it being about equal and the general shape of the farm, square. The buildings may then be located on the road and at the same time, be centrally located with reference to the field. If your farm is of such a shape and so located that if the buildings lie in the centre of it, they will not be near the public road, I will place them near it than in the centre.

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The climate of Hokkaido is such that shelter for farm buildings, is of considerable importance. A good natural shelter as one which can be afforded by a hill or dense forest often makes a change in temperature equivalent to several degrees of latitude. The temperature is greatly influenced by winds. The coldest winds in this region are those which blow from north, north-west and north-east. Therefore, if it is possible to do so, locate your buildings upon the south side of a mountain, hill or forest. A good artificial shelter may be obtained either by building a high board fence or by planting thick rows of trees. If natural shelter can be obtained in connection with the other advantages of which

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I have spoken, it is wise to so locate your buildings as to take advantage of it; but since artificial shelter can be provided cheaply, the other advantages should not be sacrificed for the sake of natural shelter.

Farm buildings should also be so located that those living in them, may not be subjected to unhealthy influences. For this reason, they should not be located where the shade of trees falls upon them or on low or marshy ground or near a swamp unless it can be thoroughly drained or some shelter put between it and the house.

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There is another point with reference to the location of farm buildings, which though not so important as those already spoken of, should not be overlooked. The world is full of beautiful scenes, and to look upon them exerts the beneficial influence upon the mind, for this

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reason, if it is possible to secure a location for farm buildings in a place from which an extensive view of the surrounding country can be seen, it is wise to do so.

Farm Buildings.

Every farmer should have a house of his own. He cannot hire a house. He must also have certain other buildings adapted to the kinds of business he intends to pursue. More buildings than he actually needs himself, are usually superfluous, especially in a country. It should be the aim of a farmer in building a house to make it as beautiful as possible. In elevation and style, it should comport with the peculiarity

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of its location. It should be so constructed as to be convenient in its interior arrangement for the performance of the work of his wife. The portion of the house where the family are to do their work, the dining and the sitting room should receive most care and attention and, if need be, the most expense.

With reference to the road I would locate a house on the north side of the road running east and west. With one running north and south, it would not make so much difference; but since the afternoon sun is that which is ^{usually} most thought of, I would locate on the east in preference to the west side of it. With those running in directions other than the cardinal points, the house should be located on that side which would insure the greatest amount

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The Location and Structure of the Barn.

The location and form
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by means of a long shed,
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which is that in case of the burning of either building, the other will be very likely to burn also. Whenever it is possible to do so, the ^{barn} should be located in this country on the north-east, or northern side of the house, since the prevailing winds are from south, south-east or south-west. During the summer season, if the barn were located on the windward side of the house disagreeable odors would doubtless be carried by the wind to the house.

The distance of the house from the barn necessary in order to make it unlikely that one mill catch fire in case other burns, must vary according to the height of the buildings, the higher they are, the greater must be the distance. From one hundred to one hundred and twenty-five feet will ordinarily be found sufficient.

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2 384
Before commencing to build a barn, the farmer should give the subject careful consideration. He should decide exactly for what purposes he wishes to use it. No particular rule can be laid down other than this. Barns should be so constructed as to be convenient for housing stock, storing crops and manure and feeding the animals which are to be kept in it. The manure made by cattle should be either stored by under some shed near the barn or in a cellar under it. Some think that the effluvia rising from the manure in the cellar, is hurtful to the stock and hay; but if the cellar is well ventilated and the floor above it, tight, this will not be the case. A cellar saves

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a great deal of expense in the handling of manure; and the first thing, then, in constructing the barn, is to make the well ventilated room under it. A barn should be so constructed, if possible, that you can drive in near the roof, as it is easier to pitch hay down than to pitch it up.

The cattle stalls, if they occupy but one side of the barn, should be placed on the south side rather than on the north, since they will be much warmer. The stall should be so constructed that cattle can be got out and in quickly. Young cattle and cows, I would tie with stanchions; but large or fat cattle or cows heavy with calf, should be tied with ropes or chains.

There should be a gutter behind the cattle stall of from

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four to six inches in depth and eighteen or twenty-four inches in width, for the reception of manure. The platform for cattle should incline to the rear a very little, one inch for a platform six feet in length being sufficient. The length of the platform should be from $3\frac{1}{2}$ - 6 ft. according to the size of an animal to be kept on it. The width allowed to each animal should be from 3 - 4 ft.

It is not good economy to have too much room in the barn floor, since this space is vacant most of the time. A width of from 12 - 14 ft. is ordinarily sufficient. The main floor should run the full length of the barn, so that you may drive through it and not be obliged to

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The Balancing or
Division of a Farm
for Different Purposes.

By the balancing or division of a farm is meant a suitable division of it into mowing, pasture, tillage, &c..

The proper division is determined by the character of the soil and the business pursued.

A good division is one that is self-supporting up to the capacity of the farm. A farmer should have mowing land enough to furnish sufficient hay to keep what cattle he can pasture in summer through the winter. He should have tillage land enough to furnish what grain, roots and vegetables his stock and family can consume, and he should

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have woodland enough to furnish sufficient timber to keep his fences and buildings in repair and to supply the necessary fuel.

Selection and Manage-
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Land.

A strong retentive soil and one which has great absorbing power with a tendency to be moist, is best adapted for mowing land. Such a soil should be moist, not because of the overflow of water from surrounding high land nor because of the presence of springs, but because of its absorbing and retaining power. A soil with some clay or a large amount of organic matter in it, is, therefore, the best soil for grass. If a

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soil is absolutely wet, it should be under drained. The importance of the grass crop for the general farmer is very great. The number of animals he can keep, depends upon the amount of grass he can produce. The amount of manure he can make, depends upon the number of animals he can keep; and the amount of crops he can raise, bears a direct relation to the quantity of manure at his disposal.

The first thing to be considered with reference to the proper management of mowing land, is the season best suited for sowing grass seed. We may adopt, as a general rule the following: — Grass seed should be sown at a season when the weather is likely to be and to continue

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for some time quite moist. This is so, because grass seed germinate much better under such conditions. The climate of Hokkaido is so humid that grass seed may be sown with a certainty of success at almost any season. But the time most suitable for the performance of this work, is the early spring or autumn. If sown in spring, the earlier the work is done, the better since the grass will have sent its roots deep into the soil before the hot suns of summer. Before sending its roots deep into the soil, grass subjected to hot and somewhat dry weather, is very likely to perish. If sown in autumn, this should be remembered; viz., the crop for the following year. In

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If I wish to raise some crop such as oats for fodder or some grain such as barley or oats on the land which I am going to convert into grass land, I would do so, sowing the grass seed with the other crop in early spring.

If sown in spring, I would always sow some grain with grass seed, since if grain is not sown, there will be a large growth of weeds which will take as much plant food from the soil as would the crop of grain. If you are so situated that you can make use a crop of fodder, it will be much better to cut grain just as it comes into blossom, as at this time it will not have removed nearly as much plant food from the soil as it would, were it allowed to ripen.

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In this locality grass seed, if sown in spring, should

be sown as soon after the snow disappears as possible. The method of doing the work, if a grain crop is sown with it is as follows:—

1. The land should be ploughed. If this is done the preceding autumn, it will be better as it will enable you to sow the grass seed earlier.

2. Harrow the land until it becomes quite smooth; and if there is any abrupt depressions or mounds upon the surface, which cannot be sufficiently levelled by the harrow, they should be harrow levelled by the use of scraper or by hand. When the land has been brought into a smooth condition

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2-394
of covering the grain; and
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6. The grass seed should be sown, care being taken, of course, in sowing both grain and grass seeds to scatter them evenly over the entire surface. This work of sowing may be done either by hand or by the use of machines. A cheap and simple machine is Cahoon's Broadcast Seed Sower. This does very excellent work. There are also machines worked by horse-power which sow grass seed broadcast in a very excellent manner. One of the best is Buckeye's Seed Drill. In sowing grain with grass seed, care should be taken to sow it rather thinly since if sown too thickly, the growing grain will choke out the grass

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and. If oats are sown, two bushels per acre will be sufficient. After sowing grass seed,

7. The land should be again brushed; and

8. Rolled. The rolling will leave the soil in good condition and the surface quite smooth.

9. If, however, there remain any protruding stones roots or materials of any sort which can be easily removed they should be picked up and carried away after the rolling is completed.

It is of the first importance as you know, that mowing lands be smooth in order that the machines used in harvesting hay may work to perfection; and, therefore, I have been thus particular in recommending the complete levelling and smoothing of the surface.

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Grass seed should not be buried very deeply, and it is for that reason that I have recommended that you cover it simply by the use of a brush. The harrow will bury it too deeply. In moist weather, most grass seeds will germinate upon the surface of the land; but a very slight covering of earth insures more perfect germination, and the brush gives a slight covering to most of the seeds.

If grass seed is sown in the autumn, the manner of doing the work, is almost precisely the same.

1. The land should be ploughed.

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3. Harrowed until it becomes quite smooth.

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5. Grass seed should be sown.

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7. It should be rolled.

8. If anything is left upon the surface, picked up and carried away.

In sowing permanent grass land, a variety of seeds should be used. Never confine yourself to one variety. Several varieties cover the land much more perfectly than one or even two or three. In selecting varieties for mowing, you should exercise care to plant upon the same field those varieties which blossom at about the same time. If you have varieties growing together which blossom at different times, some of them will not have become full grown when those which blossom the earliest will be in proper condition.

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NAMES

	NUMBER OF POUNDS IN A BUSHEL	NUMBER OF SEEDS IN AN OUNCE	TIME OF BLOSSOMING
Redtop (Agrostis vulgaris)	13	425,000	June and July
Sweet Scented Vernal (Anthoxanthum odoratum)	6	71,000	April and May
Tall Oat Grass (Arrhena therum avenaceum)	7	21,000	May and July
Orchard Grass (Dactylis glomerata)	12	21,000	May and June
Tall Fescue (Festuca elatior)	14	20,500	June and July
Sheep's Fescue (Festuca orina)	14	64,000	June and July
Meadow Fescue (Festuca pratensis)	14	26,000	May and June
Italian Rye Grass (Solum italicum)	15	27,000	June
Perennial Rye Grass (Solum perenne)	18-30	15,000	June
Timothy (Phleum pratense)	44	74,000	June and July
Red Clover			May to

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Perennial Rye Grass (Solum perenne)	18-30	15,000	June
Timothy (Phleum pratenses)	44	74,000	June, and July
Red Clover (Trifolium pratense)	64	16,000	May to September

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(Trifolium pra- tense)	64	16,000	September
White Clover			May to
(Trifolium Repens)	65	32,000	September
Kentucky			
Blue Grass			May
(sometimes called)			and
June			June
Grass (Poa pra- tensis)	13	243,000	
Rough-stalk- ed Meadow			June, and
(Poa trivialis)	15	217,000	July
Meadow Fox- tail (Alopecu- rus pratensis)	5	76,000	May, and
Lucern (Medi- cago sativa)			June
(sometimes called) Al- falfa			

The time of blossoming which I have given you in the table, is the time at which these varieties come into blossom in the northern states of the United States. Some of them, you will notice, continue to blossom during ^{only one} two months.

White Clover (Trifolium Repens)	65	32,000	May to September
Kentucky Blue Grass (sometimes called)	13	243,000	May and June
June Grass (Poa pratensis)			
Rough-stalked Meadow (Poa	15	217,000	June, and July
trivialis)			
Meadow Foxtail (Alopecurus	5	76,000	May, and June
pratensis)			
Lucern (Medicago sativa) (sometimes called) Alfalfa			

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the majority blossom during two months, while the clovers continue for four or five months. By consulting this table, you will be able to determine what varieties it is best to select for sowing together that they may blossom at the same time. You will also notice from the table that the number of seeds in an ounce by night varies very greatly being all weighing between 15,000 and 425,000. Of course, the greater the number of seeds in an ounce, the fewer pounds of seeds it will be necessary to sow per acre. A very common mixture sown in America is 13 lbs. of redtop, 11 lbs. of timothy and 8 lbs. of red clover. Where this mixture is sown, the prevailing plant for the first one or two years will be clover. After

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this, the timothy and redtop will take possession of the ground, the timothy being at first much more abundant than the redtop, but the latter will finally take possession of the greater part of the ground. This is a very good mixture since all of these varieties are excellent fodder crops, but the greater number of varieties will be preferable. The following will be a very good mixture for mowing:—

Redtop 3 lbs.
 Italian Rye Grass 4 "
 Perennial Rye Grass 3 "
 Orchard Grass 10 "
 Timothy 11 "
 Meadow Fescue 2 "
 Red Clover 8 "
 White Clover 2 "

The total mixture is 43 " which is an ample allowance. For the first few years clover and orchard grass would occupy

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Redtop	3 lbs.
Italian Rye Grass	4 "
Perennial Rye Grass	3 "
Orchard Grass	10 "
Timothy	11 "
Meadow Fescue	2 "
Red Clover	8 "
White Clover	2 "

The total mixture is 43 " which is an ample allowance. For the first few years clover and orchard grass would occupy

most of the land, but the quantity of the other varieties will gradually increase. One variety of grass seed should seldom be sown alone except for the purpose of raising seed. The following table gives the quantity per acre of some of the principal varieties:—

Kentucky Blue Grass	10 lbs.
Sheep's Fescue	10 - 14 "
Orchard Grass	14 - 20 "
Redtop	8 - 14 "
Rye Grass	25 - 35 "
Timothy	12 - 25 "
Sweet-scented Vernal	6 - 10 "

You will notice that in this table, the quantity recommended per acre is not stated definitely. It should vary according to the quality of the seed, condition of the land when it is sown as to fertility and moisture. If the seed is of the best quality and the land is rich, the

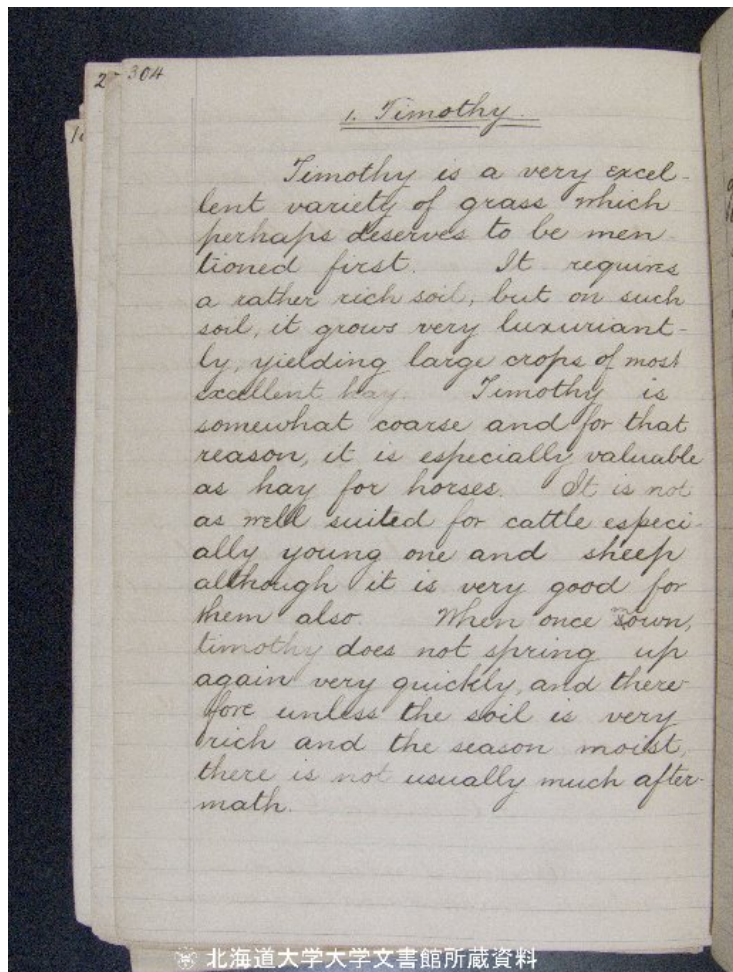
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1. Timothy.

timothy is a very excellent variety of grass which perhaps deserves to be mentioned first. It requires a rather rich soil, but on such soil, it grows very luxuriantly, yielding large crops of most excellent hay. Timothy is somewhat coarse and for that reason, it is especially valuable as hay for horses. It is not as well suited for cattle especially young one and sheep although it is very good for them also. when once mown, timothy does not spring up again very quickly, and therefore unless the soil is very rich and the season moist there is not usually much aftermath.

2. Redtop.

Redtop is a very excellent grass which will grow upon the soils on which timothy would not thrive well. It of course grows more luxuriantly on rich soils. This grass does not as quickly gain possession of ground as many other varieties; neither will it yield as large a crop as some other kinds; but it is a grass which makes hay of the best quality. It is finer than timothy and therefore better adapted to young cattle and sheep. Like timothy, it does not spring up quickly after being mown and hence does not produce much aftermath.

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2-306
of the ground and which grows with considerable luxuriance producing on good soils very large crops. It is somewhat coarse in ^{its} nature and has the habit of growing in tufts. It should, therefore, never be sown alone except for the purpose of raising seed. The hay made from this grass is not generally regarded as being of as good quality as timothy or redbtop; but if cut early and well cured, it is very good. After being mown, it springs up quite quickly and hence furnishes a large amount of aftermath. As this grass blossoms early from May to June, it is particularly well suited for sowing with clover, and also since it blossoms early — reaching a proper condition for cutting from the middle to the last of June — it is well suited for growth in this locality, since June seems

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304
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4. Kentucky Blue Grass.
(June Grass)

Kentucky Blue Grass is a variety which was found growing wild in the western sections of the United States, particularly in Kentucky and in those regions, it is regarded as being the best of all grasses. It is a grass somewhat finer than timothy, but it produces on suitable soils very large crops. It takes some time to gain full possession of the land. It has the peculiar property of continuing to send up an abundance of green leaves throughout the entire season, and is therefore a grass particularly adapted to pastures. It is as a pasture grass chiefly that it is so much prized in the west of the United

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16
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5. Italian Rye Grass.

Italian rye grass is a rather coarse variety which quickly takes possession of the ground, and grows with very great luxuriance. If allowed to remain standing until the seed is formed, it becomes very hard and wiry in its nature, not making a good hay. If, however, it is cut early, it makes very good hay. After being cut, it springs up quickly, thus furnishing a large amount of aftermath. It has many green leaves in proportion to the number of flowering stalks, and on this account and because it springs up early and grows with great luxuriance, it is a valuable pasture grass.

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6. Perennial Rye Grass.

Perennial Rye Grass is a variety very similar in its nature to the one last described, and it is valuable for about the same purposes. The quantity of the nutritive material in the rye grasses when green is not nearly so great as that in timothy. When made into hay, the difference is not so great, but particular care must be taken to cut the rye grass before the seed is formed. At this stage, they very quickly pass into a condition in which they are hard and wiry and very difficult of digestion.

7. Tall Oat Grass.

Tall Oat Grass is a variety having a habit of growing quite similar to that of the rye

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7. Tall Oat Grass.

Tall Oat Grass is a variety having a habit of growing quite similar to that of the rye

grasses. Like them, it is very vigorous and like them, it furnishes a very large quantity of green leaves. It is therefore, usually regarded as of more value for pastures than for mowing.

8. Meadow Foxtail.

Meadow Foxtail is a variety of grass which is very similar in its appearance to timothy. The head is, however, often softer, has a more wooly appearance than that of timothy. It, also, blossoms very much earlier, namely in May while timothy does not blossom until the last of June or July. There is, therefore, no difficulty in distinguishing the one from the other. The nutritive qualities of meadow foxtail are not so great as those of timothy. It sends up numerous green leaves

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311
and for this reason and also because it grows so early in spring it is valuable as a pasture grass, being esteemed very highly in England. It takes several years to gain full possession of the ground.

9. Rough Stalked Meadow

Rough-stalked meadow is a variety of grass having considerable value both for pastures and mowing. It is somewhat like Kentucky Blue Grass in general appearance and nature and like it is more valuable for pasture than for mowing.

10. Tall Fescue

Tall Fescue is a variety of grass which is somewhat fine and is valuable as a mixture especially in pastures.

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11. Sheep's Fescue.

Sheep's Fescue is a variety of grass somewhat like tall fescue; but which does not grow with so great luxuriance. It has the habit of growing in tufts and for this reason and also because it is rather a small grass, it should not constitute any considerable portion of a mixture for mowing land. It is exceedingly relished by sheep and it has an abundance of fine green leaves, and it may, therefore, be used abundantly in a mixture of pasture grasses for sheep.

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13. Sweet Scented Vernal.

This variety of grass is fine, begins to grow very early in spring and continues to furnish a liberal supply of green leaves throughout the season. Its nutritive qualities are not very great, but it is the only kind of grasses which has a decided odor. It is believed that dairy products from cows fed upon this grass have a finer aroma and flavor than those from cows fed upon this grass any other variety of grass. Though it constitutes but a small portion of a mixture of grasses, yet it will impart its peculiarly agreeable odor to the whole when made into hay, and therefore it may well be used in small quantity in a

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mixture of seeds for permanent mowing. It should also be put in a mixture of seeds for pasture.

14. Red Clover.

Red Clover is a plant belonging to the natural order Leguminosae, and as a fodder crop, it perhaps ranks second to none. It quickly takes possession of the ground, sends its roots deep down into the soil and grows on rich soils furnishing large amount of fodder per acre. On poor soils, it cannot be grown with profit. It blossoms early and after being cut it springs up very rapidly almost always furnishing two good crops per year and very frequently three even in this latitude. Its nutritive value

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15. White Clover.

White Clover is one which never grows as large as red clover. Like red clover, however,

ever, it blossoms early and springs up quickly after being cut or eaten off. The quantity produced per acre will never be so large as the quantity produced by many grasses, but while clover is very nutritious and is exceedingly well liked by all animals. It should, therefore, be sown in permanent grass fields and in pastures, much more so than red clover.

16. Alfalfa.

Alfalfa is a plant also belonging to the Leguminosae which is extensively cultivated in some regions as a fodder crop. It is somewhat like clover in appearance. Like clover, it sends its roots to a great depth. Like it, it springs up quickly after being cut or eaten off. But

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unlike it, it is not perfectly hardy. It is doubtful whether it can be successfully cultivated in Hokkaido. As the alfalfa sends its root to such a great depth, it has the greater power to withstand the injurious effects of long continued dry weather than most other fodder crops.

17. Alsike Clover.
(*Trifolium hybridum*)

This variety of clover is perhaps the hybrid between the white and red clover as it partakes of the characteristics of each. The habit of growth more nearly resembles that of red clover. The shape of the blossoms is like the white, and the color of the blossoms intermediate between the white and the red. This clover is not so extensively

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318
Management of Perma-
nent Mowing.

No land except that which is occasionally overflowed by the water of some river or stream can long continue to bear large crops of grass without manure. The quantity of manure necessary, depends upon the character of the soil and the time at which the grass is cut. Those soils which are naturally adapted to grass, that is, which are absorptive and retentive of moisture, require less manure than those which are of drier nature. Your rule should be to apply manure whenever the crop of grass is so small as not to produce at least two tons of hay per acre. The manner of application should either be well rotted composts or some mineral manure specially

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adapted to the needs of the soil. Ashes naturally give very good results if the soil is not too wet. If uncomposd manure is applied, there will be a loss in decomposition since from the nature of the case, it is impossible to mix manure, applied to grass lands, with the soil. — it must not lie upon the surface of the land. Manure applied to grass lands should always be fine, as coarse manure lying upon the surface of the ground will interfere with the working of harvesting implements and also be likely to be raked with the hay. II. The time manure should be applied to grass land is a matter of considerable importance. If your farm is situated in a place where the winters are very cold, and where it is not

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likely to be much snow, the early fall will be the best possible time for the application of manure to grass lands, since if applied at this time it will stimulate the grass to make a growth, which, remaining upon the land during the winter, will protect the roots of grass. If situated in a country where there is always an abundance of snow, this protection will not be as important and therefore, you may apply manure to the best advantage whenever you can do it most cheaply, and with the least injury to the surface of the land. In a region like Sapporo, any time during the autumn or winter months will be suitable for top dressing mowing lands. Manure should never be applied to grass lands late in spring, if it is possible to do the work at any other time.

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The ground is not infrequently rather soft at that season and driving upon it with heavily loaded wagons will make the surface uneven. Then, also, manure applied at this season does not, unless it is very fine, become well incorporated with the soil. Much of it is likely to be dried up and great lumps of dry manure will be mixed with the hay. Manure should never be drawn upon grass lands and left in heaps for any great length of time. Permanent mowing fields some-
times become "turf-bound" as it is called; — that is, they become so full of grass roots and so solid that grass cannot grow well. A soil having clay in it will get into this condition much ^{more} quickly than those destitute of it. Mowing fields when they become "turf bound" should be ploughed and reseded; and

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if the object in view is to make them produce grass again as quickly as possible, the best time for the performance of the work is the autumn. Lands which can be irrigated, will produce large crops of grass without other manure, and whenever possible, mowing fields should be irrigated.

Time and Manner of Harvesting the Hay Crop.

There are different opinions in regard to the proper time of cutting grass for hay. At different periods of their growth the grasses have very different elements in them, and we wish to cut them when they contain the greatest amount of digestive, nutritive material. As the seeds of grasses are not ordinarily digested, the best time for cutting grasses

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is just as they are coming into blossom. The time of cutting, however, should depend somewhat upon the kind of stock to which the hay is to be fed. For milch cows and young or fattening animals, it should be cut early, but for working cattle and horses, later. Good hay should have as much as possible of the sweet odor and oil of the grass in it. To insure this, it must have only just as much sunshine to keep it from moulding, and after it is cut, no rain or dew should be allowed to fall upon it. The amount of drying necessary depends much upon the condition of the grass when it is cut. If it is green and succulent, it will need more drying than if it is older. The number of days necessary will depend much upon the amount of sunshine, the humidity of the air and the direction of the wind. In this climate, it is ordinarily necessary

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to dry hay two days at least and not infrequently three days are necessary. The manner and time of doing the work should be as follows:—

1. Grass should be cut in the morning of a good day after the dew is off. The best method of mowing is, of course, by the use of a mowing machine. After the grass has been dried about two hours, it should be

2. Turned with a hay tedder and if the day is a remarkably good one, or if the grass did not need much drying, it will dry sufficiently to be carried into the barn by two or three o'clock in the afternoon.

In far the greater number of cases, however, in Hokkaido it will need another's day's drying. At about four o'clock, therefore, it should be raked with the horse rake and made into cocks, which, if the weather looks as though it might rain soon should be care-

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fully made and covered with hay caps. The following day, as soon as the dew has dried off, the hay should be spread more or less care fully according as it needs more or less drying. After about an hour and a half or two, it should be turned with a hay tedder, and if it needs a great deal of drying, it may be turned again after about another hour. In most cases, if the weather is favorable and the grass not too green, the hay will be dry enough by two or three o'clock on the second day, when it should be carried into the barn as quickly as possible. After about five o'clock, the air usually becomes somewhat damp, therefore it is better to get in hay early in the afternoon. If the weather is somewhat unfavorable and the grass rather green, when cut, it may be necessary to dry another day, in which case it should be raked up and made into cocks as described for the first day and

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to circumstances. We are entire-
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to get wet, and you should remem-
ber that hay which has been
dried considerably is much more
injured by wetting than that
which is comparatively green.
You must also remember that hay
which has been wet, always re-
quires a great deal of subsequent
drying.

Mowing grass late in the
afternoon, is a practice which has
some advantages. Mown at this
time, it will not wilt sufficient-
ly before night to be injured by
the dew, and this, falling upon
the purple surface of it, quickly

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be enough. The directions I have given you will, of course,
be modified according to circumstances. We are entirely
dependent upon the weather in making hay. It should be
your rule never to allow any hay to get wet, and you
should remember that hay which has been dried
considerably is much more injured by wetting than that
which is comparatively green. You must also remember
that hay which has been wet, always requires a great deal
of subsequent drying.

Mowing grass late in the afternoon, is a practice which
has some advantages. Mown at this time, it will not wilt
sufficiently before night to be injured by the dew, and this,
falling upon the purple surface of it, quickly

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dries off the next morning, and if the grass is well tended the day after it is cut, it will have dried much more than grass mown after the dew is off.

Curing Clover.

Well cured clover is ^{the} most excellent hay; but if cured in ordinary way, (that is, by exposure to the sunshine with frequent turnings), many of the leaves and blossoms will be broken off and lost and you will have left little but dry hard stalks.

Clover, after it is cut, is injured more by the rain than most of the grasses, and if it is cut green as it should be, it will need more drying than most grasses. The method of drying, however, should be dif-

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turned the first day as directed
for the grasses. It should then
be made into cocks which should
be covered with the hay caps.
If the weather is ^{fine} ~~clear~~ ^{stagnant}, it
should be allowed to stand in
the cocks until cured, ~~these~~
cocks being simply turned over
and spread very slightly on
the day in which you are going
to carry the hay to the barn.
This method of curing is the
best for clover, wherever there
is not too much rainy weather,
but if the climate is very moist
and rains, frequent, the clover
will be likely to heat very much
in the cock and would, therefore,
it may be the best policy to
manage clover as directed for the
grasses with this exception that
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ly as the leaves and blossoms

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will be broken off by ^{such treat-} the swing-
ing ment.

Implements Nec-
sary for Harvesting
Hay.

Every hay maker who has any considerable amount of grass to cut, should have a mowing machine, horse-rake and hay-tedder.

Mowing machines are made for use with either one or two horses. The best mowing machine, in my opinion, is the Buckeye. Wood's mowers are also very good. Horse rakes are always drawn by one horse, and the best are those which are mounted upon wheels and on which the driver rides and works the implement. Among these, Taylor's is one of the best. The Lock joint and the Bay

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State are also good rakes. The revolving horse rake is a cheap wooden implement which does very good work and since such rakes can be easily made here they may prove well adapted for use by common farmers. The American Hay Tedder is one of the best which have been made. It is usually operated by one horse. In a country where labor is high, if the farmer has much hay to secure, it may be profitable to have a hay loader. It is an implement which will take hay from the wind rows, and carry it on to a wagon. A horse fork is used in unloading hay in the barn, and is exceedingly useful when the hay is to be lifted to a great height. There are many good forks among which I know Gardiner's to be one which does good work. I regard the machines which

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I have mentioned as ranking in importance in the following order:—

Mowing machine,
Horse Rake,
Hay Tedder,
Horse Fork,
Hay Loader.

Besides these machines, every farmer must, of course, have hand forks of various sizes, hand rakes, convenient wagons or carts for the transportation of the hay. A very useful hand rake is one which is called the "Loafer" or "Hand Drag Rake". The wagons or carts used in carrying the hay to the barn, should be such that you can make a long wide load, since it is much more convenient to put a large amount of hay into such a load than into a high one.

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Height at which
Grasses should be
cut.

It is not an uncommon custom to cut grass as near to the ground as possible. This is wrong, as a certain equilibrium should be kept up between the roots and the leaves. If all the leaves are cut off, it injures the plants, and therefore, it is for the general interest of the farmer to cut his grass at a little height from the ground. About three inches is usually the best height.

Storing Hay.

There are two general ways in which hay is stored up, viz. in the barn and in

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stacks. All hay should be put into barns if possible; but hay, in a well-made stack will keep very well, although there are always some hay upon the surface of the stack which will be much injured. A circular stack is the best form, since in it, less surface is exposed in proportion to the amount of hay than in stacks of any other form. In building a stack, it should be made rather small at the bottom and should gradually grow larger as it rises from the ground until about the centre when it should be made smaller to the top. As the stack is made, the hay should be trod down hard and ^{should always be} the highest in the centre. After the stack is completed it should be well raked down, and if you wish to keep the hay in the best

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possible manner, the stack may be thatched with straw or some kind of coarse grass. In storing hay in the barn, you should get in as much as possible at one time and tread it down solid.

Salting Hay.

It is a common practice to salt hay when it is put into the mows especially if it is a little too green. Doubtless, this is sometimes a good practice, but hay is often much injured by too much salting. As a general rule, however, therefore, do not salt hay. But if at some time, you have a small quantity of hay which you think is not dried quite enough, it may be well to use a little salt. A peck (5 sho) of salt to one ton of hay would

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be sufficient, and it should be scattered uniformly throughout the mass. After hay has been put into the barn, it is usually found best to keep the doors of the barn cellar closed as much as possible, since the access of the external air to the outside of the mows, will prove more injurious than beneficial. It is, of course, more important that the doors be kept closed during rainy weather and at night than during pleasant sunny days.

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