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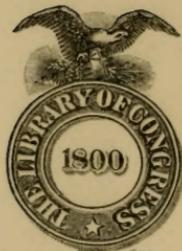
# Alfalfa

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*The Money Crop of the  
West and Northwest*

**Its adaptation to the Agricultural conditions  
of the territory reached by the North-  
Western Line, and its influence upon  
Cattle, Hog and Dairy Interests**

**Industrial Department  
Chicago & North Western Railway  
215 Jackson Boulevard  
Chicago, Ill.**



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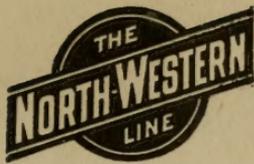
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This Great Money Crop  
of the West and  
Northwest*

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## OUR OBJECT

With the advent of new settlers in the fertile, but less thickly settled portions of our western agricultural country, smaller farms are the order. This in turn demands changes that will in every way be beneficial to the farmer and to the country at large. The writer is prompted, therefore, to write this booklet having in view such changed conditions.

Until recently, the farmer has had the use of free and unoccupied land, producing free pasture in abundance and hay at cost of harvest, but present increased values have much restricted him in the use of unoccupied land.

No one questions the value of nutritious, wild, prairie grass for hay or pasture, and as a pasture product we will first consider it. On the prairies in the west it is available about May 1st as a permanent pasture; about August 1st it is preserved, and when reduced by pasture use it is not again available until the following May. In other words, its use is for a period of about three or four months in twelve. It then becomes necessary to introduce a pasture that will furnish a longer period of use, or seed an additional amount of fall and winter feed. It requires, ordinarily, more acres of wild grasses than tame, to support a farm animal. A comparison of the values of tame grasses is entirely favorable to the production of *ALFALFA*.

We personally commenced the production of alfalfa several years ago in South Dakota, and have been modestly successful, at least to the extent that we know it can be profitably produced. We prophesy the next five years will find it firmly established as a permanent product of South Dakota and other western territory, and that whenever this is accomplished, land now commanding a price of \$20.00, \$25.00, \$30.00 and \$40.00 per acre will be in greater demand and at prices much advanced.

With this view, we have endeavored to present in this pamphlet the practical view of a producer and the testimonials of other producers, together with compilations from eminent gentlemen who have more technical knowledge than the writer. The combination we trust will be useful, especially to the settler on the western prairies.

In mentioning different methods of cultivation, many of them in the same locality, criticism is not intended, but the different methods produce different results, and a description of them demonstrates that proper methods are the largest factor in the successful production of alfalfa. If a method is in effect that will not produce a profitable result where a different method would produce an average crop, the wrong procedure is more harmful than shown by the loss of the crop, as it serves also to demonstrate that alfalfa cannot be successfully produced on the farm in question.

We have in view many failures, partial failures and unsatisfactory results, and our own somewhat varied experiences. If by proper demonstration it develops that a crop cannot be profitably produced on your farm, devote your land and energy to other lines, but do not condemn your efforts to succeed unless you are satisfied your procedure was right. We contend that some localities are not adapted to alfalfa production and we only recommend its production where at least an average crop can be secured.

The Breeders Gazette, which is recognized as an authority, classes any land that will produce alfalfa as worth in value not less than one hundred dollars per acre. Undoubtedly an average crop and a reasonable location should qualify such statement as conservative. In the states of Minnesota, South Dakota and Nebraska, alfalfa production is not an experiment; it can be demonstrated and is demonstrated as a successful production in different localities, but the methods are so unsettled as to add a certain element of uncertainty to the results, lowering and making the average production much less than a proper standard would secure. The method we have adopted and recommend is, we think, especially adapted to South Dakota, particularly the western portion of the state, where favorable results will add many times to the present values of land.

We advise care, work and patience, and the use of a small area of land, with repeated efforts before you are convinced of failure.

In covering the proposition of procedure over an area represented by state lines, we are not unmindful of the different conditions that exist in different localities; yet our subject does not require exactly similar conditions to admit of similar procedure.

We fix one fast rule: More efficient work to increase the average standard of production and quality, keeping step with progress and business demands, preventing possible discouragement caused by misdirected effort, and removing the production of alfalfa from the experimental stage in the shortest possible time.

## SELECTION OF GROUND

The importance of careful and proper selection of ground is apparent. If the crop is an experiment, we advise a small area. The experiment will thus be as complete, and we think, usually insures better work and care, and the better crop thus secured insures better future conditions, seed, etc. In a subdivision of essential conditions we class then in order:

- Cultivated land or new breaking,
- Condition of fertility,
- Preparation of fertilized land,
- Soil, sub-soil and top-soils,
- Drainage,
- High or low land.

Assuming that soil inoculation is not necessary, and irrigation is not available, on a farm consisting of one hundred and sixty acres where it is the desire of the owner to produce from ten to forty acres of alfalfa, the owner should secure an average yield for the crop, of two and one-half to three and one-half tons per acre, on two or three cuttings.

## **THE VALUE OF NEW OR OLD LAND**

The results of seeding alfalfa on the first breaking of new ground is not generally favorable. The absence of weeds the first year on sod usually makes a good showing, but the root does not usually penetrate below the plow line. On the contrary, it diverges along under the sod and sub-plow line, and the root does not develop vitality or strength to support permanently a healthy, strong plant. The usual result is half as much stand, or less, the second year, and a poor, weak, straggling plant at spare intervals the third year. On the other hand a well cultivated, deep plowed field, with equally favorable conditions, will produce a penetrating, strong, healthy root that in turn will support a healthy, permanent plant. After the first year sub-soil is the important factor and on sod seeding sub-soil is never reached. Select old cultivated land with proper regard for other necessary essentials and secure a good root and permanent growth. We do not mean land that is not fertile by reason of excessive poor farming, but well cultivated land that is above the average in fertility.

## **FERTILITY AND PREPARATION**

Condition of fertility and preparation to produce suitable and proper fertility must be observed, and on account of prior use of such land is wholly necessary. Alfalfa requires a fertile soil. While it is admitted that soil that produces very little vegetation, without irrigation, will produce a crop of alfalfa, the cause of no vegetation without irrigation is not that the soil is not fertile, but arises from other causes, usually climatic conditions. If the soil is not fertile it should be made so, and the application of farm manure fertilizer usually supplies other elements necessary to produce and support the plant. The method of preparation varies, but on account of the harmful effect of weeds following common farm-produced fertilizer we advocate its application the year prior to alfalfa seeding and the extermination of resultant weeds that have germinated, not allowing them to reseed. Common farm-produced fertilizer will produce weeds, but if treated a year in advance, fertility is secured and weeds eliminated to a certain extent. Application of fertilizer can be followed by millet, or the weeds mowed or plowed under before maturity of seed, and after alfalfa is seeded do not hesitate to sacrifice the first year's crop of alfalfa by cutting in time, so that weeds will not germinate and get the start of the plant. Results

cannot be expected anyhow, the first season, and the third season the crop and stand should be better than the second year, as it requires about three seasons to secure the best crop.

## SOILS AND DRAINAGE

We think top soil of a light variety, not sandy, with a light clay sub-soil, and not too close to water is preferable. This soil, if fertile, and not sandy, quickens the growth, and the plant is protected by the moisture retaining clay sub-soil later. Do not select land that is not thoroughly surface drained, and the drainage will settle a high or low land selection. Water standing one day on alfalfa in a depression will affect it seriously; and if it freezes you can depend on a field with spots where the depressions filled up and water froze, and later such depressions will be filled up with a growth of weeds. The drainage question is the first to consider; and as to high or low land, the extremes are to be avoided. A gumbo element in soil properly cultivated is not undesirable, but it should be thoroughly cultivated and well drained. Farm manure is of great value on gumbo soil; it serves to loosen the soil, and to admit air and water. It should be cultivated with the soil and thoroughly worked together until it is well mixed, fine and uniform. We do not desire to fix a standard including particular soils to the exclusion of others; we simply state our preference after experience on both high and valley land and on slightly different soils.

Our views on drainage are such that we do not think it possible to secure a satisfactory crop from any soil without proper and adequate drainage. In the territory described our reference is particularly to surface drainage and selection to secure natural surface drainage.

## CULTIVATION AND PROPER AMOUNT OF SEED

We express ourselves forcibly in favor of thorough cultivation. We laid the foundation for this when we advised a small area or acreage. When we say good cultivation, we mean much better than the average. The object is to secure a good, even stand. This cannot be done without each step in procedure being right. It is not intended to re-seed like clover or coarse grains; and this emphasizes the necessity for a uniform, even stand, as the advantages are multiplied by the years of its growth and cannot be successfully remedied in the same field by re-seeding. Cultivation should be made to a garden condition. After deep plowing the cultivation following plowing does not require the depth to the extent of the plowing; such cultivation depth is not advisable. But it should extend below the depth of the seed.

The amount of seed necessary depends to quite an extent on the condition of cultivation. With a cultivation to a garden condition, an even distribution of seed and a fair cover, fifteen pounds of seed to the acre

is sufficient without a nurse crop, and twenty pounds is perhaps better under average conditions. If good work is performed in preparing the seed bed it is as cheap as additional seed and very much better.

We recommend twenty pounds of seed per acre with a germinating percentage of 90 per cent.

### **KIND OF SEED AND HOW SEEDED**

Mild climatic seeds will germinate in a more severe climate but do not stand the necessary after tests. Climatization of seeds is a pronounced necessity. The permanency of an alfalfa crop is a large element in its value and the severe test of permanency, other conditions being favorable, lies in the winter-resisting power of the plant, made possible by acclimation of seed. Theorists inform us there is no complete remedy against winter killing, on account of there being no seed yet sufficiently climatized to wholly resist it. We agree with such theory, but the seed that has been longest produced under same conditions will produce the highest per cent of good results under similar conditions. If seed can be secured in a locality where it is to be seeded and it has been successfully produced in such locality for a period of time, it is the most desirable seed to use, the period of time it has been produced in such locality adding value to it as a seed for such locality. If you cannot secure such desirable seed, secure seed that has been produced in a more remote locality but where conditions are similar to your locality.

Good seed is determined not only by the value of the first crop, but by its permanency.

### **SEED VARIETIES**

The Turkestan varieties have been recommended for use in South Dakota and as far south as the south Nebraska line. "Grimm's" alfalfa, a history of which is given in this booklet, is also recommended, as it seems to have the longest location pedigree in a location desirable for use in the district we have described; and we recommend this class of seed. The merits of "Grimm's" alfalfa are dependent entirely on its unbroken period of location production, producing a seed so climatized as to withstand the winters peculiar to the northwest, where the temperature in winter is low and dry, and where a small amount of snow falls frequently and is retained on the fields.

Secure seed as we have recommended and perpetuate it by reproduction until you have added to its value by acclimation. It is conceded acclimation is the most important essential of a new alfalfa seed. If your field is winter-killed, it is largely a question of seed acclimation and you should remedy it by another attempt.

Do not mix alfalfa and other grass seeds.

## MANNER AND PROCEDURE IN SEEDING

Regarding the question of how to seed, it is highly important to secure an even, sufficient distribution of the top soil from one to one and one-half inches in depth, according to moisture conditions. The seed should be sufficiently deep in the ground to be brought in contact with moisture sufficient to insure germination.

Assuming the plot of ground is to be small (from one to ten acres), we prefer the small hand crank seeder. It requires more time than the drill or large seeder, but if a large acreage is seeded and the press drill used, we recommend seeding the field both ways and without a nurse crop. We prefer to recommend seeding without a nurse crop, as the alfalfa can then be harvested without regard to any specific time—any time considered best—either for the alfalfa or to exterminate weeds; while if a nurse crop existed, the alfalfa might in some way be injured by waiting a proper time to harvest the nurse crop. A nurse crop is not necessary during the growing season and affords little aid at other times. As a weed exterminator it has advantages, but its disadvantages are many and the weeds can be killed more effectively in a different manner. A nurse crop has to be removed to treat weeds. The nurse crop also absorbs a part of the moisture from the ground and it is often best to cut alfalfa after the seeding the first season to destroy weeds which could not be done if there was a nurse crop.

### THE TIME TO SEED ALFALFA

The proper time to seed, we think, is as soon after the fifteenth of May as possible, not later than June 10th, and never seed unless ground is moist at a depth where seed will lodge deep enough to insure germination. The object in spring seeding is to secure as strong and healthy a plant as possible to resist winter climatic conditions. It must be reasonable to assume such strong, well rooted plant would have advantages over one of younger growth and less developed root. We have never been successful in treating spots that did not have a stand from first seeding, by re-seeding such spots. The causes that produced the first result always existed, and yet if it was a result of soil conditions it would have been discovered and successfully treated by application of the different elements necessary. In our re-seeding, the cause was usually a depression not drained, which could with time and work have been remedied, but the remedy should be applied before seeding the first time. Drainage will usually add to uniformity if there is a growth in other parts of the field. Late seeding gives time for necessary previous cultivation and weed extermination.

## TREATMENT OF UNIFORM THIN GROWTH

The disk is resorted to by many to thicken and even a stand of alfalfa. We think it proper after the first year, provided conditions are favorable, but care should be exercised to prevent harm. It is necessary to have a reasonably uniform stand to avoid weeds where a stand is thin, for if weeds are not eradicated they will soon destroy a thin alfalfa stand. You will succeed better than to re-seed and you may have to sacrifice one or two crops to secure a satisfactory stand; if so do it, as the good stand is necessary. If necessary to eradicate weeds, make other sacrifices by cutting the alfalfa high above the ground a few times. We have recommended other preventatives for weeds which we consider more desirable. You have noted we have not advocated re-seeding; we have not been successful along such lines. We recommend proper and thorough cultivation and proper seed bed, and results will come without other assistance. If necessary to use the disk, set the blades straight and do not *tear* the ground, but *cut* it, and the crowns will not be injured.

## PROCEDURE AND TIME OF HARVEST

We have now covered the preliminary work of alfalfa production from selection of ground to completion of seeding, and the next in order is harvest and care of crop. There is no experiment necessary for this purpose. Harvesting at the proper time and in the proper manner is important, in order not to injure succeeding crops and to preserve and secure the crop harvested. The time to harvest is when the crop is in early bloom and the manner is to cut the crop from two to three inches above the ground. We have secured the best results by such procedure and there will be very little exception taken to this procedure by those who have finally adopted this method. Too close cutting, too early or too late harvest has a detrimental effect which can be prevented by the two propositions regarding time and method of harvest. When it first begins to bloom the new shoot is just starting for the succeeding crop, and we do not advocate too close cutting and never too late in the season.

## PRESERVATION OF QUALITY AND QUANTITY

The method of preservation is not a simple one; it involves preservation of quality and of quantity and is more slow and requires more care and work than ordinary hay harvest. The less handling the better; additional handling carries loss in quantity. The dropping of leaves from a cured plant means serious loss and is easily accomplished; as a consequence the procedure should be slow enough to insure care and preservation. This can be done, the method being to only harvest, if possible, what can be cared for in one day; and placing in barn, shed or stack only in such

quantities that it will finish the curing or preservation process without injury and not be so fully cured when handled as to lose in quantity by the breaking and loss of leaves. This requires judgment and care, yet can be done without loss of time. The hay racks should be covered with old cloth or sacks to prevent loss in transit. It will be observed that the curing of alfalfa that is to be stored in barns, sheds or stacked, should be done on a bright day with no dew or moisture on the hay.

## **PRESERVATION AND HANDLING IN STACKS**

If alfalfa is to be stacked, practically the same method can be used. In starting, do not load on the stack more than three or four feet of partly preserved alfalfa until that amount has cured; then proceed to construct the stack in sections at intervals, allowing sufficient intermediate time to cure the preceding sections in the stack. If necessary, several stacks can be in course of construction simultaneously, to make the work continuous. The same care should be used in taking the stack down for use. The stack should always be cut with a hay knife and not removed in a promiscuous way, like other hay. We recommend moderate sized stacks and we advise a complete covering with a good quality of cured prairie hay, after alfalfa preservation is assured. It must be remembered that alfalfa hay is more susceptible to injury by weather conditions than the wild prairie grasses.

## **HARVESTING AND SECURING SEED**

When the ball is matured, examination will develop a mature inside seed, usually about ten days after disappearance of the blossom. If the crop is harvested in the usual way and threshed before stacking it saves additional handling and loss. Hullers and other properly improved machinery are best, of course, but we anticipate such improved machinery will not always be available. The threshing machine has performed our work, with the sieves set much the same as for flax threshing. Many balls were not broken in this process, and it required an extra amount of cleaning, which was undesirable. After the necessary cleaning, the seed should be kept dry and not be exposed to extreme temperatures.

Testing alfalfa seeds can be accomplished in the same manner as with other seeds. For this purpose take two flannel pads with a tin plate, the pads evenly moistened and kept at an even room temperature. Between these moistened pads place one hundred seeds, those germinating being the percentage demonstrating the test. Either the first or the second crop will produce seed, but we have preferred to use the second, as it gave us the first early hay and we were more liable to secure three cuttings during the season by the first early harvest.

## **LONGEVITY OF ALFALFA FIELDS**

This is dependent on conditions; we have seen fields twenty-four years old in Meade County, South Dakota, without irrigation, that were in a healthy condition, producing a profitable crop. The water line, conditions of soil and the opportunities given by eradication of weeds, and an occasional light manure top dressing and necessary attention, will add materially to longevity. We know South Dakota, and especially the western section, is specially adapted to a profitable alfalfa growth, and with proper procedure, unusual longevity is assured for the plants.

## **ALFALFA A SOIL MAKER**

As alfalfa is one of the legume or clover family, it possesses inherent soil-making qualities. Its extraction of nitrogen from the air assists in building plant tissue, and as the foundation for a crop rotation it has merit equal to clover. There is no intelligent person who does not advocate crop rotation as a necessity, and intelligent rotation begins with a legume crop; and if a foundation for crop rotation can be produced at a profit and maintained by unusual longevity, it is apparent that it has no equal, either for profitable production or as a soil maker. Its use, therefore, is as much to be encouraged for the one purpose as the other; we will demonstrate more particularly regarding its commercial value, however, for its value as a soil maker is not challenged.

## **VALUE OF ALFALFA FOR HAY AND PASTURE**

Alfalfa has more varied uses as hay than for pasturage. It is more valuable for hog pasture than for other farm animals, yet such use is detrimental to a permanent stand of alfalfa. Other animals can be pastured on alfalfa fields with care and profit, but its comparative value, everything considered, is more as a hay crop. Pasture has a tendency to introduce other grasses and weeds, and, while it is exceedingly profitable for hog pasture, it must be expected that its permanency will not be secured by such use.

We think as a general proposition it should be harvested and fed green or harvested and preserved and the stand more fully protected. As a pasture, care must be taken that it is not fed too close, so that the crown end of the root may be protected.

**TABLE 1**

From the special bulletin issued by Wisconsin State University covering experiments made at the Experimental Station Farm, we have compiled a comparative value table based on value per ton of timothy hay on the farm at \$2.50 per ton.

KIND	Yield per acre	Comparative weight green	Per cent hay protein	Pounds protein per ton	Pounds protein per acre	Comparative value per acre, based on protein
Alfalfa.....	5.4 tons	100	18.17%	363.4	1962.3	51.75
Red Clover....	2.5 "	50	13.28%	265.6	664	17.51
Timothy.....	2.3 "	33.3	4.74%	94.8	218	5.75
Brome-grass..	1.3 "	20	6.07%	121.4	157.8	4.16

Against the accurate comparative value as demonstrated by the above table is the comparative cost of work, seed and harvest, but charging such difference in the table would leave an exceedingly favorable comparison in alfalfa production. The table above consists of essentials that vary but little making the result dependent only on variation in yield per acre. The yield per acre shown in the table is above the average, but it is accurate for the place and time it was produced.

**TABLE 2**

The following table shows a comparison of cost incident to production of grasses, with other information covering costs up to the harvest and for the first year only. It does not include net results, which will be set forth in a succeeding table. This is intended as applicable to South Dakota. You will note in addition to plowing, we have added \$3.50 per acre for seeding and extra cultivation, and this money (or labor representing so much money) is well invested.

KIND	Pounds seed per bushel	Pounds seed per acre	Cost of seed per acre	Cost of seed per pound	Plowing land per acre	Extra cultivation per acre	Total cost per acre
Alfalfa.....	.60	20	\$3.20	\$.16	\$1.00	\$3.50	\$7.70
Red Clover...	.60	10	1.20	.12	1.00	3.00	5.20
Timothy.....	.45	16	.56	.035	1.00	2.00	3.56
Brome-grass...	20	25	1.75	.07	1.00	2.00	4.75
Upland.....	0	0	.00	.00	.00	.00	.00

The above table shows in detail the visible cost of perfecting a seed bed, necessary labor and expense the first year. We do not include any harvest expense the first year, as it is not anticipated that the first crop will more than pay such expense of harvest, consisting chiefly of necessary expense in cutting at an opportune time to eliminate weeds. The item of "extra cultivation" will ordinarily cover other expenses.

**TABLE 3**

An estimated South Dakota table of comparative values of hay produced without other than procedure outlined by us, and based on such estimated yields per acre as will appeal to the reader as natural and reasonable, is as follows. It is based on a value of \$2.50 per ton of timothy and an average of 2½ tons per acre. The production is considered conservative.

KIND	Yield per acre	Per cent protein, hay	Pounds protein per ton	Pounds protein per acre	Comparative value per acre, based on protein
Alfalfa.....	2.5 ton	18.17%	363.4	908	\$23.98
Red Clover.....	1¾ "	13.28%	265.6	464	12.25
Timothy.....	1½ "	4.74%	94.8	142	3.75
Upland.....	1 "	6.25%	125.	125	3.30
Brome-Grass....	1 "	6.09%	121.4	121	3.19

The above is an estimated yield per acre, with the actual test of protein in each kind of plant and its comparative value per ton. This is done by taking timothy at \$2.50 per ton on the farm as a basis, based also on percentage of protein each item contains. We have included upland prairie hay to make the table valuable as a South Dakota comparison, and against above values per acre should be charged the difference in cost of seed, work and harvesting of each crop, shown in another table. For feeding purposes the relative amount of protein would produce a more conservative estimate for alfalfa than the others, as it is a more equally balanced ration.

**TABLE 4**

The following table shows in detail the second year's expense in harvesting and securing the crop, the total expense and gross value per acre and the net results. The preliminary expenses in table 2 are not included for the reason that in the alfalfa crop such expense would be absorbed through the years of future growth.

These figures are based on an average yield of 2½ tons per acre.

KIND	Cost per acre to harvest	Cost per acre to secure	Total cost per acre	Total value per acre	Net profit per acre, based on protein
Alfalfa.....	\$1.00	\$3.25	\$4.25	\$23.98	\$19.73
Red Clover .....	.55	2.00	2.55	12.25	9.70
Timothy.....	.40	1.55	1.95	3.75	1.80
Brome-Grass.....	.30	1.15	1.45	3.30	1.85
Upland.....	.25	1.15	1.40	3.19	1.79

The above table is applicable to South Dakota conditions. It is intended to be conservative, but is subject of course to varying conditions. We insist that the cost of preparation for the alfalfa seed bed is absolutely necessary in order to secure adequate results.

**TABLE 5**

A farmer operating a farm of 160 acres and desiring to engage in mixed farming and to maintain soil fertility must engage in live stock production and produce legume crops for feed and as an additional soil maker, and assuming that twenty-five acres of one crop would be the maximum, we have compiled the following table showing comparative results from twenty-five acre plots yielding an average of 2½ tons per acre.

KIND	Value per acre, based on protein	Value 25 acres, based on protein
Alfalfa.....	\$19.73	\$493.25
Red Clover.....	9.70	242.50
Timothy.....	1.80	45.00
Brome-Grass.....	1.85	46.25
Upland Hay.....	1.79	44.75

The above represents the net value, all cost of production and harvest deducted, based on comparative value and production, and is of course subject to variation. The estimates are intended to be conservative and are based on procedure we have outlined, which would without doubt produce results not much at variance with these figures.

The question of the number of acres of alfalfa to produce on a farm of one hundred and sixty acres is dependent on many considerations. From tables submitted the question that is raised at once is, "Why not produce more alfalfa by devoting more acres to alfalfa?" The answer is found in former statements—few farms have in one plot more than twenty-five acres out of a total of one hundred and sixty acres that is in every way adapted to such use when all conditions of soil are favorable, as the right location, perfect drainage and other favorable considerations are usually found in plots of less than twenty-five acres. A gentle slope is preferable, not too much, but void of even slight depressions where water will remain for several hours and thus destroy the growth. We advise smaller plots, a few acres in favored localities and the aggregate acreage confined to a small area. Thus the results will be equal to a much larger area, if all necessary conditions are carefully observed, and the acreage can at a future time be increased to meet further demands.

While it is a fact that results displayed in the tables published herein are based on average conditions, yet these results are largely dependent on the amount of work put in on the seed bed and the crop. If ample preparation, care and cultivation are not given the result is not only correspondingly less, but the parity of the figures in these tables is entirely destroyed.

Seed is expensive and if the work is to an extent experimental, reduce the acreage until such time as you produce your own seed, then seed in plots in a dozen different favored localities in preference to selecting one field of varied conditions. One acre will produce a reasonable test; one hundred acres might be a problem. In any event it will not be so much of a problem if the one acre has proved a success. Our advice is directed to the small farmer who is beginning an experiment which, if reasonably successful, will prove a decided success in every way.

**TABLE 6**

From the experimental station bulletin No. 105, University of Nebraska, we compile some comparative values in feeding experiments, the test in the following table being made with 100 grade calves, winter feed, December 15th to April 11th, and in addition to the hay with which comparison is made, each calf received a daily grain ration of two pounds, consisting of two-thirds corn and one-third oats.

KIND	No. of calves	No. days on feed	Av. pounds gain daily	Total average gain	Hay each calf per day	Hay each 100 pounds gain	Grain each 100 pounds gain
Alfalfa.....	20	116	1.23 lbs.	143 lbs.	12.3 lbs.	1000 lbs.	162 lbs.
Prairie hay.....	20	116	.65 "	76 "	10.9 "	1676 "	305 "
Cane.....	20	116	.39 "	46 "	14.3 "	3666 "	504 "
$\frac{1}{2}$ each alfalfa and prairie hay.....	20	116	1.14 "	133 "	15 "	1315 "	174 "
$\frac{1}{2}$ each alfalfa and cane....	20	116	1.20 "	140 "	17 "	1416 "	165 "

This table is complete to an extent that shows the relative value of alfalfa with other forage and a light grain ration, and especially as a winter feed. All of the calves while on feed were subjected to similar treatment, the only exception being the kind and quantity of hay above mentioned. The table shows the favorable results from alfalfa hay and the production per acre would add greatly to this favorable comparison.

**TABLE 7**

This table shows the same calves as included in table 6. The second winter, ten of the original steers withdrew, leaving eighteen in each lot and five lots. The feed had been revised, those fed alfalfa the first winter were fed cane in this table; those fed prairie hay the previous winter were fed one-half each of alfalfa and cane; those fed cane the first winter were fed alfalfa in this table; those fed one-half each alfalfa and prairie hay the first winter, received the same in this table; those fed one-half each alfalfa and cane the first winter were fed prairie hay in this table. No grain was fed with this test and the experiment covered a period of four months.

KIND	No. of steers	No. days on feed	Av. daily gain or loss in pounds	Total av. gain or loss in pounds	Pounds hay fed per steer	Av. hay fed per steer daily, pounds	Hay fed per 100 pounds gain in pounds
Alfalfa.....	18	120	.67 lbs. Gain	81 lbs. Gain	2424	20.2 lbs.	2990 lbs.
Prairie hay.....	18	120	.15 lbs. Loss	18 lbs. Loss	2242	18.7	Loss
Cane.....	18	120	.53 lbs. Loss	64 lbs. Loss	2881	24	Loss
$\frac{1}{2}$ each alfalfa and prairie hay....	18	120	.51 lbs. Gain	62 lbs. Gain	2471	20.5	2950
$\frac{1}{2}$ each alfalfa and cane.....	18	120	.76 lbs. Gain	92 lbs. Gain	2721	22.7	3980

There being no grain used in this experiment and the groups being revised from the previous winter, makes the result a most interesting one—showing the comparison favorable to alfalfa. The result in this table should be carefully considered in connection with the change in feed from previous winter.

**TABLE 8**

Comparative value of hay and corn fodder, fed with an equal amount of snapped corn at Agricultural Experimental Station (Bulletin No. 93), University of Nebraska. The experiment was made with six lots of ten steers each, practically even weight and conditions, which were fed twelve weeks. The amount of snapped corn being equal in each lot with the exception of the last two.

KIND	Average weight per steer.	Average gain per steer 12 weeks in pounds.	Average gain per steer per day in pounds.	Average grain per steer per day in pounds.	Average roughness per steer per day in pounds.	Grain consumed per pound gain in pounds.	Roughness consumed per pound gain.	Total feed consumed per pound gain.
Prairie hay.....	975	101	1.20	9.47	18.22	7.87	15.16	23.03
Prairie and alfalfa.....	979	169	2.01	9.47	21.10	4.70	10.47	15.17
Alfalfa.....	977	173	2.06	9.47	22.15	4.60	10.75	15.35
Corn stover.....	976	86	1.02	9.47	22.86	9.25	22.44	31.69
Corn stover and alfalfa.....	974	165	1.96	9.61	22.45	4.90	11.44	16.34
Corn fodder and alfalfa.....	972	152	1.81	9.61	22.45	5.31	12.41	17.72

This table is interesting from the fact that it shows relative gains on this class of steers, two years old, fed grain and alfalfa, and grain and other hay and fodder. The distinction between corn fodder and corn stover is as follows: corn stover is the stalk when the ears and husks have been removed; fodder is the stalk with the husk attached. The above experiment closed January 24th, which represents an early feeding.

**TABLE 9**

Comparative value of different rations, including alfalfa hay, as a mixture with other grains and compared with other hay and other mixtures—Agricultural Experimental Station Bulletin No. 93, University of Nebraska. The experiment was made with the same steers as in table 8, commenced February 15th and was for a period of eight weeks. Three weeks intervened between the two experiments and during that time the steers were gradually changed from snapped to shelled corn.

KIND	Average weight per steer in lbs.	Average gain per steer 8 weeks in pounds.	Average gain per steer per day.	Grain consumed per steer daily.	Pounds hay consumed per steer per day.	Grain consumed per pound gain.	Hay consumed per pound gain.	Total feed consumed per pound gain.
Shelled corn and prairie hay.....	1176	71	1.27 lbs.	19.1 lbs.	5.5 lbs.	15.10 lbs.	3.94 lbs.	19.04 lbs.
Shelled corn 75%, bran 25% and prairie hay.....	1146	111	1.98 "	25.5 "	5.5 "	12.97 "	2.78 "	15.75 "
Shelled corn 90%, oil-meal 10% and prairie hay.....	1187	141	2.52 "	24.6 "	6.8 "	9.77 "	2.70 "	12.47 "
Shelled corn 90%, cottonseed meal 10% and prairie hay.....	1154	128	2.29 "	24.6 "	6.2 "	10.77 "	2.72 "	13.49 "
Shelled corn and one-half each alfalfa and prairie hay.....	1164	128	2.29 "	23.2 "	8.1 "	10.16 "	3.55 "	13.71 "
Corn and cob meal and one-half each alfalfa and prairie hay.....	1169	110	1.95 "	19.2 "	7.5 "	9.77 "	3.85 "	13.62 "

The object of table 9 is to show the relative results of protein concentrates (as in bran, oil meal and cottonseed meal) as compared with protein in roughness (as in alfalfa). The results as noted are again favorable.

**TABLE 10**

Comparative value of a corn ration fed in different quantities to hogs on alfalfa pasture, Agricultural Experimental Station, University of Nebraska Bulletin No. 99. The experiment was made with three lots of 17 hogs each, of an average equal weight, being of a light weight class, the experiment being for 98 days.

KIND	No. of pigs in each lot	No. days fed	In pounds average gain	Average daily gain in pounds	Grain fed per 100 lbs. gain
1. Alfalfa pasture and $\frac{1}{2}$ corn per 100 lbs . . . . .	17	98	27	.28	124
2. Alfalfa pasture and $1\frac{1}{2}$ corn per 100 lbs . . . . .	17	98	36	.37	222
3. Alfalfa pasture and $2\frac{1}{2}$ corn per 100 lbs. . . . .	17	98	48	.51	332

The " $\frac{1}{2}$  corn" means one-half pound per 100 pounds of hog daily, the weight being taken and adjustment of corn to such weight made each two weeks.

With corn at 35 cents per bushel and hogs at \$5.50 per cwt., the profit would be represented as follows:

Lot 1. . . . .	\$1.28 on each pig
Lot 2. . . . .	1.48 " " "
Lot 3. . . . .	1.64 " " "

The above would be exclusive of value of alfalfa pasture.

**TABLE 11**

Comparison of value of alfalfa with other grain rations and with corn and with barley; Agricultural Experiment Bulletin No. 99, University of Nebraska. There were 60 hogs placed in six lots of ten hogs each.

KIND	Number of pigs	Number of days fed	Average weight	Average gain	Average daily gain in pounds	Grain fed per 100 pounds
Corn . . . . .	10	91	131	104	1.14	528
Corn and alfalfa hay. . . . .	10	91	131	116	1.27	491
Corn 75%, alfalfa cut 25%. . . . .	10	91	131	115	1.26	420
Barley . . . . .	10	91	126	102	1.12	573
Barley and alfalfa hay. . . . .	10	91	127	110	1.21	562
Barley 75%, alfalfa cut 25%. . . . .	10	91	127	98	1.07	492

This was an important test and represents an intermediate weight of hog in the test.

**TABLE 12**

Comparative value of alfalfa pasture and no grain. This is compiled from Agricultural Experiment Station Bulletin No. 99, University of Nebraska. These hogs were more mature than those in the preceding table and were one year and over, showing light weight, mature hogs. The three lots fed at different dates give fair average tests.

	Number of pigs in lot	Number days experiment	Average gain pounds	Average daily gain pounds
June 17th to August 26th, 1904.....	14	70	34	.5
August 20th to October 22nd, 1904.....	10	63	27	.43
July 27th to October 20th, 1904.....	18	95	50	.53

The first lot of 14 hogs were over one year old and thin; the second lot dry brood sows and the third lot same as second lot. The entire lot averaged 4.9 pounds gain per day; the average days fed 76

**TABLE 13**

We have compiled this table from the preceding tables, 10, 11 and 12, showing hogs on light corn and alfalfa pasture; hogs on alfalfa and other grains mixed, and on corn and barley without alfalfa, and hogs on alfalfa pasture without other rations.

	Average number of hogs	Average number days fed	Average weight	Average gain	Average daily gain	Grain fed per 100 lbs. of hog
Table No. 10....	17	98	52	37	.39	229
Table No. 11....	10	91	129	107.5	1.18	511
Table No. 12....	14	76	173	37	.49	

This table represents a summary comparison of tables 10, 11 and 12. The details of each separate table should be studied to give desired results.

In the tables submitted we have secured those only where alfalfa was the entire ration or a part of it; and while our combination tables represent a summary, it is not of value compared with each separate experiment made in tables preceding. We think on the whole the tests have covered such periods of time, conditions and other range of essentials as to make them a subject of interesting study.

## **HARDY ALFALFA**

by

**W. A. Wheeler, Secretary and Manager Dakota Improved Seed Co., Mitchell, S. D.**

Since the introduction of alfalfa into the northwest as a farm crop the question of hardiness has been one of prime importance. It is only in recent years that alfalfa has come to be considered as one of the important crops of the northwest. It has been grown in the middle west and western states, south of the 42nd or 43rd parallel in the United States for more than half a century, and it has been under cultivation in the Old World according to historic records since the 5th century B. C. In recent years it has found its way into Montana, North and South Dakota, Minnesota, Michigan and even into Saskatchewan and Manitoba. Since its advent into this northern territory the question of hardiness has been given some attention by experiment stations and alfalfa growers. The alfalfa plant as a forage crop is so valuable that the subject is worthy of a great deal of attention, for if alfalfa can be produced with safety and profit throughout the northwestern states, it will become the most general and profitable hay crop grown.

In taking up the subject of hardy alfalfa it is not my intention to discourage in the least the growth of alfalfa as a general crop in the northwest. Instead of this I wish to do everything I can to extend the growth of this valuable forage crop. However, if we are going to have stocks of alfalfa that will live through our hardest winters, making it possible to have a single field remain in good condition for from 25 to 50 years, we will have to look to special hardy varieties. In spite of the fact that hardiness is an attribute of so great importance, comparatively little attention has been given to the producing, breeding or securing of hardy strains. It will be of interest to all farmers in the northwest to know what has been done in this line of work and what progress has been made toward the securing of a strain of alfalfa that will be hardy under all conditions.

The alfalfas which were brought over to this country and which were first introduced into cultivation were southern stocks which were brought from the southern regions of Europe and Asia. These being brought directly from the milder climate did not give the best of results in the northwest because of their inability to withstand our severe winters. The yields that they produced were very large and showed the possibilities of this crop when we would be able to secure hardy strains. The Minnesota Experiment Station was one of the first of the northern states to seriously take up the proposition of endeavoring to secure alfalfa adapted to our conditions. About eight or ten years ago there was called to the attention of the Minnesota Experiment Station an alfalfa that was growing in the

vicinity of Excelsior, near Lake Minnetonka. It was noticed that the farmers in that vicinity had been growing alfalfa for a number of years and had succeeded in maintaining their fields through the winters without loss to the stand, while in many other sections of the state alfalfa very frequently killed out in severe winters. It was thought at first that this might be due to local conditions in the vicinity of Excelsior, but it was very soon discovered that the farmers who did not use their home-grown seed from this particular stock but sent away for their seed did not secure the results that were obtained from the homegrown stocks. Repeated trials were made with seed secured from other more southern localities, where alfalfa was made a general crop, and a large number of failures resulted.

When Professors Hays and Boss, of the Minnesota Experiment Station, had this particular alfalfa called to their attention they started an investigation to determine what had been the record of this alfalfa in the vicinity of Excelsior. They succeeded in bringing out the complete history of this stock and were aided by Mr. A. B. Lyman, of Excelsior, who gave them every possible assistance in securing this information and later in securing seed of this hardy alfalfa for trial. The original source of this alfalfa is given very briefly by Mr. Chas. Brand in an article in Science from which I quote as follows:

“In that year (1857) there came to this country from the little village of Kulsheim, near Wertheim, in the Grand Duchy of Baden, a German farmer named Wendelin Grimm. Like many of his countrymen Grimm went west, taking up a farm in Carver County, Minn.

“Among the few possessions that he brought from his old home with him was a small bag containing less than twenty pounds of seed of the alfalfa or lucerne, commonly cultivated in Baden. Grimm applied numerous local names to this alfalfa, but most commonly he called it ‘ewiger Klee’ (everlasting clover) referring to its perennial nature.

“This small lot of seed was the progenitor of an alfalfa industry that has existed in Carver County, Minn., for more than a generation and which is now being extended into other parts of the cold northwest.”

This gives briefly the origin of the hardy alfalfa which is now well and favorably known under the name of the Grimm alfalfa or Grimm's Everlasting Alfalfa.

It is true that we have had only a few years in which to study the Grimm alfalfa since it was first located and called to the attention of scientists, but every evidence that we have of records since that time and every record that we have found of the results obtained from it since it was first brought into this country, go to demonstrate its unusual hardiness and general

adaptability to northwestern conditions. The U. S. Department of Agriculture and all of the state experiment stations in the northwest are today working with this stock in particular.

I saw a field of it in Saskatchewan, Canada, in 1906, which had withstood the winter when the other stocks under trial were almost entirely killed out. In North Dakota, Minnesota and South Dakota it has always shown its hardiness, never to my knowledge having been excelled in this respect where a good comparison was made. It is a fact that at the Minnesota Experiment Station, the Grimm alfalfa has to some extent been killed out under most severe conditions. It is well known, however, that there are conditions in the vicinity of the Twin Cities and many other portions of eastern Minnesota which are very unfavorable for alfalfa, and these factors are to a large extent responsible for some of the failures in this region. In fact, the Grimm alfalfa, in its adopted home near Excelsior, Minn., rarely produces seed enough to pay for cutting the crop for this purpose. In South Dakota, however, under conditions prevailing in the vicinity of Highmore and Mitchell, Grimm alfalfa is one of the best seed producers that we have, often producing twice as much seed as any other stock under trial, excepting S. D. No. 167. This latter number is one of unknown origin. The only record that we have of it as to source is that it has been grown in South Dakota for about 12 years. In all tests with the Grimm alfalfa it seems to produce the same amount of seed, starts just as early in the spring and has an equal forage value. In fact it appears to be identical with the Grimm alfalfa.

Aside from the work that has been done on the Grimm alfalfa, large numbers of importations of alfalfa have been made from Turkestan in the hope of finding an alfalfa that would be perfectly hardy in the northwest. Several of the importations that have been made and tried out have proved to be quite hardy in trials at the Dakota Experiment Stations and in Minnesota. Many others have proved very tender. This result is of course to be expected, for the province of Turkestan is a very large country and has a range of climate from a very mild temperate climate in the south to rather a severe climate in the north of the province. Following the first introduction and recommendation of Turkestan alfalfas there have been a large number of importations into the United States by commercial seedsmen without any regard to the region of Turkestan from which they came. The general importations of Turkestan alfalfa are, therefore, today, to a large extent discredited as hardy alfalfas. In comparisons made of commercial Turkestan alfalfa with commercial stocks from southern points I find that the Turkestan alfalfas in general are more hardy than the southern stocks, but aside from hardiness they have shown that they are not in general good seed producers. This has been especially true with those stocks which have shown the greatest amount of hardiness. This

naturally places them at a great disadvantage in comparison with other stocks that would produce an amount of seed sufficient to be handled in a commercial way.

The Grimm alfalfa in its adopted home near Excelsior does not usually produce a large amount of seed, but this is true of all alfalfas in that vicinity. When grown in the Dakotas and Montana, Grimm alfalfa appears to be a better seed producer than any of the commercial strains or any other of the improved stocks. Bulletin No. 101 from the South Dakota Experimental Station gives a report of the trials at the Highmore and Brookings stations made by the writer during the seasons of 1905 and 1906. These records cover too brief a period to draw any definite conclusions; however, the evidence given in the bulletin is in accordance with other reports from other experiment stations and so is worth considering.

From the tests in South Dakota four stocks have proved hardy and are recommended. They are the following:

*South Dakota No. 162:* The Grimm alfalfa which has been grown for over fifty years near Excelsior, Minn. In Canada, North and South Dakota and Minnesota this has proved the hardiest alfalfa under trial.

*South Dakota No. 167:* Secured by the South Dakota experiment station at Brookings in 1905. On all tests since that date at the Highmore and Brookings stations and in my plats at Mitchell this appears to be the same as the Grimm alfalfa. It has shown itself equal in hardiness and seed production. Its record is not known for as many years as the Grimm but so far as known it is equal to it.

*South Dakota No. 164:* Grown for several generations at Brookings and Highmore from P. I. No. 991, imported by Prof. Hanson for the U. S. Department of Agriculture in 1898.

*South Dakota No. 240:* According to the records this is from the same source as No. 164. It has been grown continually at the Highmore experiment station from the original seeding. It is not equal to No. 164 at present in seed production.

Aside from these numbers there are being tried at the Brookings and Highmore stations and next year will be tried at a large number of the South Dakota State Experiment Stations the stocks that were brought over from Russia by Prof. Hanson the past season. It will naturally take ten or fifteen years before the value of any of these can be very clearly determined, but it will be of interest in the meantime to keep watching all of them and note what results are being obtained.

At the Minnesota station the Grimm alfalfa seems to be very much the most promising and this is highly recommended. The selection and breeding of alfalfa at this station has been handicapped by the fact that very little, if any, seed is ordinarily produced by the selected plants because of the unfavorable conditions for seed production.

In North Dakota Grimm alfalfa has been grown in various ways. No full report has yet been made by the experiment station, but several results have been secured, all of which point to the fact that the Grimm alfalfa is the hardiest under trial. They have also had good results from gene al Montana grown seed and the Turkestan alfalfas. There is being carried on at the present time at the Dickenson Experiment Station in North Dakota, an investigation of a large number of kinds of alfalfa from all over the world to determine their comparative hardiness. Mr. L. R. Waldron who is in charge of the experiment station at Dickenson, in writing in the Dakota Farmer regarding this first year's trial, says:

“We had 68 strains go through, or attempt to go through, the winter of 1908-1909. There were eleven consecutive days of that winter which averaged colder than any similar period in any winter since records were kept, which I think is since 1891. During those eleven days the ground was only slightly protected by snow. With the kind permission of the Dakota Farmer I desire to give in its columns in the near future some of the results of this experiment as far as it goes. To say the results are of interest and value is putting it mildly. Without spoiling the promised article, I might say that we found the winter divided the alfalfa into two groups. These groups are: the Grimm Alfalfa and—the others.”

This simply adds one more evidence as to the hardiness of the Grimm alfalfa in North Dakota.

## ALFALFA

by

**J. V. Bopp, Associate Professor of Agronomy,  
South Dakota Agricultural Experiment Station**

South Dakota has demonstrated that its soils and climate are adapted to produce plants in many respects. The production and steady increase has kept stride with the development of the country and in some localities has outstripped it, so that in some regions more is produced than is needed for consumption and is baled and exported to other markets. The acreage is being gradually pushed out of the region of the James River and out of the Black Hills into that area which was thought, until a few years ago, only fit for stock raising.

Bountiful crops have been produced in the Black Hills without irrigation, yields of two to three and one half tons not being uncommon. Farther east of this section the crops are somewhat lighter, the average being from one to two tons per acre.

Within the last few years, however, a new industry has sprung up, that of growing alfalfa for its seed. Phenomenal yields have been secured which are not surpassed in any other section of the country. Instances have been known where it yielded twelve bushels of seed per acre and an average of from six to eight bushels are quite common. This crop is grown after harvesting the first cutting for hay, and what this industry will mean for South Dakota can be easily surmised. Such fields have been seeded from five to ten years. There are, however, some fields which have stood for twenty-five years and are still giving profitable yields, yet the best fields are those seeded recently.

Alfalfa has a tendency to become thinner in stand as the fields grow older. This can be accounted for in part by the fact that very few growers give their fields any treatment. I am of the opinion that an alfalfa harrow or disk used judiciously would lessen this tendency and thus prolong the life of the field.

Winter-killing seems to be the result of neglect or mistreatment of the field rather than to the plant being unable to endure the ordinary climatic changes. Well cared for fields have stood the seasonal variations of temperature and moisture very well. Wherever alfalfa stands in low spots, where the soil is poorly drained, its death is only a matter of a short time. Where irrigated, low spots must first be drained, otherwise no alfalfa need be expected under such conditions. Instances can be shown also where a field was cut too late in the season, so that the plants did not have time to recover before being subjected to harsh weather; and invariably the field would be killed and fail to resume its growth in the spring.

Lack of cultivation permits the weeds to make their appearance. Were the fields disked, influx of weeds could at least be partially checked. Cultivation answers a threefold purpose; that of killing weeds, splitting the alfalfa crown and conserving moisture. Where the stand has become thin it has been renewed by permitting the few plants to seed, then disking this seed in. Heavy stands have thus resulted.

To the prospective grower, as well as those who have already made a success of it, a few timely hints may be of value. In the first place it is absolutely essential to select a good field. A hard and fast rule may be set down and that is "Alfalfa will not stand wet feet." The soil must, therefore, be well drained at all times, for standing water will kill it before anything else. A soil that is loamy or clayey in texture is better suited than sand and is given preference. Where sandy soil has ground water within three or four feet of the surface, it will prove as good as loam or clay. Of the high upland soils, sand does not do as well as heavier types. Alfalfa follows best as a cultivated crop which has been kept comparatively free from weeds. The land should be plowed in the fall to a depth of six to eight inches. No cultivation should be given this until early spring, when it should be disked so that the disk laps half. This is important, for the ground should be as level as it is possible to get it, in order to secure an even stand. The soil should be disked and harrowed in the spring to conserve moisture and kill the few chance weeds until May or the fore part of June, which is the average time for sowing.

Most farmers make a practice of seeding with a nurse crop, especially where the moisture supply is limited. The Grimm, Turkestan or a variety already growing in the locality, should be chosen and sown at the rate of twelve to twenty pounds of seed per acre, the rate depending on the vitality of the seed and the manner of seeding.

Alfalfa is best seeded with a drill because it can be distributed more evenly and covered at a more uniform depth. For this reason it is highly essential to have the seed bed level, because a uniform stand is one of the first requirements for successful culture. If the seed is covered too deeply, too much energy is required to push to the surface and when seeds germinate on the surface they are too often killed by the hot sun.

The treatment while the plants are small varies with the crop itself. If the field becomes weedy, it should be clipped when the plants are from four to six inches and the clippings allowed to remain on the field. The field is then well harrowed. This has a tendency to stimulate the plants, and they respond with renewed vigor. Occasionally, with clean fields, a crop may be harvested the first year. However, the plant should have made from six to eight inches of growth in order to winter best.

Alfalfa should be cut for hay when about one-tenth of the blossoms are out. After the removal of the hay the field should be double disked

for the reasons herein mentioned. Two crops are the customary harvest, while at times a third is cut. With three cuttings the plants are, however, so low in vigor that they easily winter kill.

Since South Dakota has grown alfalfa successfully for a number of years, her future in this respect is indeed bright. Alfalfa makes an acceptable feed for all kinds of stock and should, with barley, brighten the future of the stock raiser as well as the grain raiser

HILLAND (STANLEY COUNTY), S. D., Dec. 13, 1909.

TRAFFIC DEPARTMENT, C. & N. W. RY. CO.,

WINONA, MINN.

*Gentlemen:—*

My experience with growing alfalfa in Stanley County began nine years ago, when I seeded about a quarter of an acre of creek bottom land with five pounds of Turkestan alfalfa seed bought in Milwaukee. This experimental plat was new ground plowed deep and disked and dragged a good many times. I had a good stand and it is a good stand now; has been cut three or four times each year, depending on whether the first cutting was early or later. Since then I have sown a number of different fields, both on upland and bottom land, using homegrown and Montana seed. Have not failed to get a good stand and very little winter killing. I made a mistake in using Brome grass with part of my seeding, which in time crowds out the alfalfa.

I have had best results from seeding on clean potato or corn ground, disked and dragged early in the spring and again May 15th to 20th, seeded broadcast at that time and dragged lightly. Last year the early spring being very dry, I seeded a few acres on fall plowing with a double disk drill at the rate of 20 pounds per acre and got a fine stand and good growth. I always seed without a nurse crop and mow at least once, sometimes twice, to keep down the weeds, this depending on the rains. All our farming has been done without irrigation. Our yield on bottom land has been three tons per acre or better; on upland one and one-half to two tons to the acre, depending on summer rains.

I have had a good stand from sowing on sod, but on account of crowding out by native grasses the land should be well cultivated for two seasons for best results. After cutting first crop I allowed a few acres to go to seed the past season and threshed at the rate of four and one-half bushels per acre of clean seed. The hay when nicely cured is worth nearly as much as the same weight of grain. I find it especially valuable for milch cows, colts and calves.

Yours truly,

(Signed) E. A. MORRISON.

ABERDEEN, S. D., Nov. 14, 1909.

TRAFFIC DEPARTMENT, C. & N. W. RY. CO.,  
WINONA, MINN.

*Gentlemen:*—

Alfalfa can be profitably grown without irrigation in this section of the State (that is, the northern part). A fair average of two cuttings would be two and one-half to three tons to the acre. I got three tons without irrigation.

None of the alfalfa which I have has passed more than one winter but the winter of 1908-09 was a hard winter on alfalfa and clover, although mine went through without any injury. The alfalfa I have is called Grimm's Minnesota Alfalfa. Weeds do not affect it after it gets well rooted. The first year, when the alfalfa is first starting, the weeds will probably be quite thick, and I think it should be topped at least twice during the summer. Cutting does not hurt the alfalfa but stops the growth of weeds.

I consider the alfalfa hay raised from an acre of fair alfalfa worth from thirty-five to forty dollars. The expense of putting it up is about \$4.00, so we can say the net return from an acre of alfalfa is \$30.00, which would be as good a net return from an acre of alfalfa as from two acres of corn.

I have fifteen acres of alfalfa, seven acres of which was seeded in 1908 and eight acres in 1909. The ground on which it is sowed is high prairie land with heavy loam, and well drained.

The land I sowed in 1908 was plowed about September 1, 1907, about eight inches deep; was cultivated three times in the fall of 1907, and four times in the spring of 1908. The cultivation was done by disking and dragging. The seed was sowed about the first of June, 1908, and the ground was in good condition. About sixteen pounds of alfalfa seed was sown to the acre without a nurse crop. I used a disk drill with a grass seeder attachment, putting my seed in the grass seeder, which worked finely. The seed used was Grimm's Minnesota Alfalfa.

The first year it was cut twice, and as high as I could set the mower, not only that, but I tilted the mower up so that it cut very high. Both cuttings I left remain on the ground as a mulch. In 1909 I cut two crops from this field for hay. The first crop I cut when about a fifth was in blossom; the second crop came on during harvest and I did not cut it until about one-half was in blossom. The yield was three tons to the acre. I weighed the first cutting, which yielded a ton and a half to the acre, and estimated the second cutting, which was as good or a little heavier than the first, although it was not cut as early as it should have been.

For the eight acres which were sowed in 1909, I prepared the land about the same as I did the first seven acres, except that I only cultivated it twice

in the fall and three times in the spring, and did not cut it but once this year. In fact, I didn't give this year's seeding as much care as I did last, and I think the stand is not as good as I got a year ago. My next alfalfa planting I shall do as I did on my first field.

I also raise timothy and clover, but I consider my alfalfa to be much more valuable and shall increase my acreage considerably the next two years. In my estimation of alfalfa I figure two and one-half tons to the acre at \$14.00 per ton; the corn at forty bushels at \$0.50 per bushel. It is, I think, easier to raise three tons of alfalfa to the acre than fifty bushels of corn. I intend after cutting another year to top-dress my alfalfa with manure from the cattle yard at the rate of about eight loads to the acre.

Any good tillable land that does not overflow or have water standing on it will grow alfalfa. Forty-eight hours under water will probably kill an alfalfa plant and twenty-four hours will do it great damage, therefore the land should be well drained.

Land should be plowed deep and thoroughly cultivated, using every effort to destroy all weeds and weed seeds. The cleaner the ground, the better chance the young alfalfa will have.

Seed bed for alfalfa should be free from weeds and trash, plowed deep, cultivated with a disk and dragged to make it fine and clean. Seeding may be done either with a drill or broadcast, a drill with a grass seed attachment preferred. If sown broadcast it should be lightly dragged after the seeding.

About fifteen pounds to the acre if sown by the drill; if sown broadcast, a little more than that (possibly eighteen pounds), is the amount of seed that should be used.

The best fields in this section were sown alone, although some good results have been obtained with a nurse crop, but the general opinion is to sow the alfalfa alone.

The first season the field will probably have many weeds or much pigeon grass and should be cut two or three times and allowed to fall as a mulch on the field. Fight the weeds and the alfalfa will take care of itself after the first season. After the first year alfalfa can be cut twice and possibly three times, depending very much on the season.

Yours truly,

(Signed) ISAAC LINCOLN.

PIERSON FARM, YANKTON, S. D., Nov. 28, 1909.

TRAFFIC DEPARTMENT, C. & N. W. RY. CO.,  
WINONA, MINN.

*Gentlemen:*—

We have secured two and one-half tons of alfalfa to the acre in two cuttings and have pastured the land in the fall.

The alfalfa has been seeded and produced as above for about twenty years. Think it was sown in the spring of 1890.

If the land on which the alfalfa grows is flooded, or there is a heavy snow, it will kill out; but we have not had any killed out by the influx of weeds.

Our alfalfa has been sown on the Missouri River foot bluffs, one mile from the bank of the river, on sloping, well-drained ground. It will not do well on wet ground with us; will kill out the first year.

The alfalfa was sown with a crop of spring wheat, after the land had been placed in the best condition possible, well plowed and harrowed. We sowed the spring wheat and after harrowing well, sowed the alfalfa, and then went over with brush drag and smoothed the ground good, sowing from 12 to 16 pounds to the acre.

There has been in all about three hundred acres sown, some of it twenty years ago, and same has been cut for hay and pastured more or less each year. The crop this season has been as good as for any previous year. When plowed up we get big crops of corn and the ground is always in fine fix.

We have had the best results by sowing with a nurse crop and have always sown it with spring wheat.

The proper time to cut alfalfa is when it is in bloom. We cut three crops some seasons but found it does better to cut twice and pasture the last crop, but not too short.

(Signed) E. R. HOULTON,  
Manager Pierson Farm.

VIEWFIELD, S. D., Dec. 1, 1909.  
(9 miles north of Underwood, S. D.)

TRAFFIC DEPARTMENT, C. & N. W. RY. CO.,  
WINONA, MINN.

*Gentlemen:*—

Although there are a few who have grown alfalfa for a long time past in this vicinity, the production of same is still in its infancy. For the last three years the seed has been threshed to a large extent after the first cutting, the sale of such seed being very profitable, as you will note by statement of the sale of my 1908 seed crop.

Number acres harvested for seed.....	22	
Number bushels seed threshed.....	180	
Price per bushel.....	\$6.00	
		<hr/>
Receipts from sale of seed.....		\$1,080.00
Number tons hay cut first cutting.....	70	
Value hay per ton.....	8.00	
		<hr/>
Value of hay crop.....		560.00
		<hr/>
Total value crop of the 22 acres.....		\$1,640.00
An average return per acre of .....\$74.55		

The hay cut from two of my fields this year, first cutting only, which was sown by me some eighteen years ago, averaged at least two tons to the acre, and with the exception of a few dry years the amount cut from the first crop was as good if not better an average than that. Up to three years ago, or until the time that I started to thresh the seed, the second crop would average from one to one and a half tons per acre, and after that cutting I would have the use of the fields as a pasture until well along in the spring.

The only damage any of my fields have suffered is through winter-killing, due to water standing on it and freezing, and that only in spots. As for damage by weeds, same has been slight if any. Alfalfa, a good growth at least, seems to choke out the weeds and as the first cutting of the hay is usually made before the weeds ripen, there is not much chance for spreading.

I have two fields on low land and one field on high ground. The low land fields, which have a good strong growth, were sown eighteen years ago without the aid of a nurse crop, while the field I planted last spring on upland was put in with a crop of oats and barley, the grain being sowed with a drill and the alfalfa put in with a hand seeder. The part sown with barley was fairly good, but that sown with oats did not amount to much and will have to be reseeded. The ground was plowed deep and harrowed thoroughly and from my experience I think it best to put alfalfa in by itself.

The first cutting of alfalfa should be made about the first to the middle of June, or when the field just commences to blossom good.

Yours truly,

H. C. JUDSON.

UNDERWOOD, S. D., Nov. 25, 1909.

TRAFFIC DEPARTMENT, C. & N. W. RY. CO.,  
WINONA, MINN.

*Gentlemen:*

I have been engaged in the production of alfalfa for the past ten years have studied and experimented with it more or less during that time, and as a result of such experience, I have decided that as a farm or business proposition under proper conditions, there is no better for seed or feed purposes.

On alfalfa sown by me six years ago the average yield per acre this year, first cutting, yielded about two and one-half tons to the acre, second cutting one ton and the third crop used for cattle pasture.

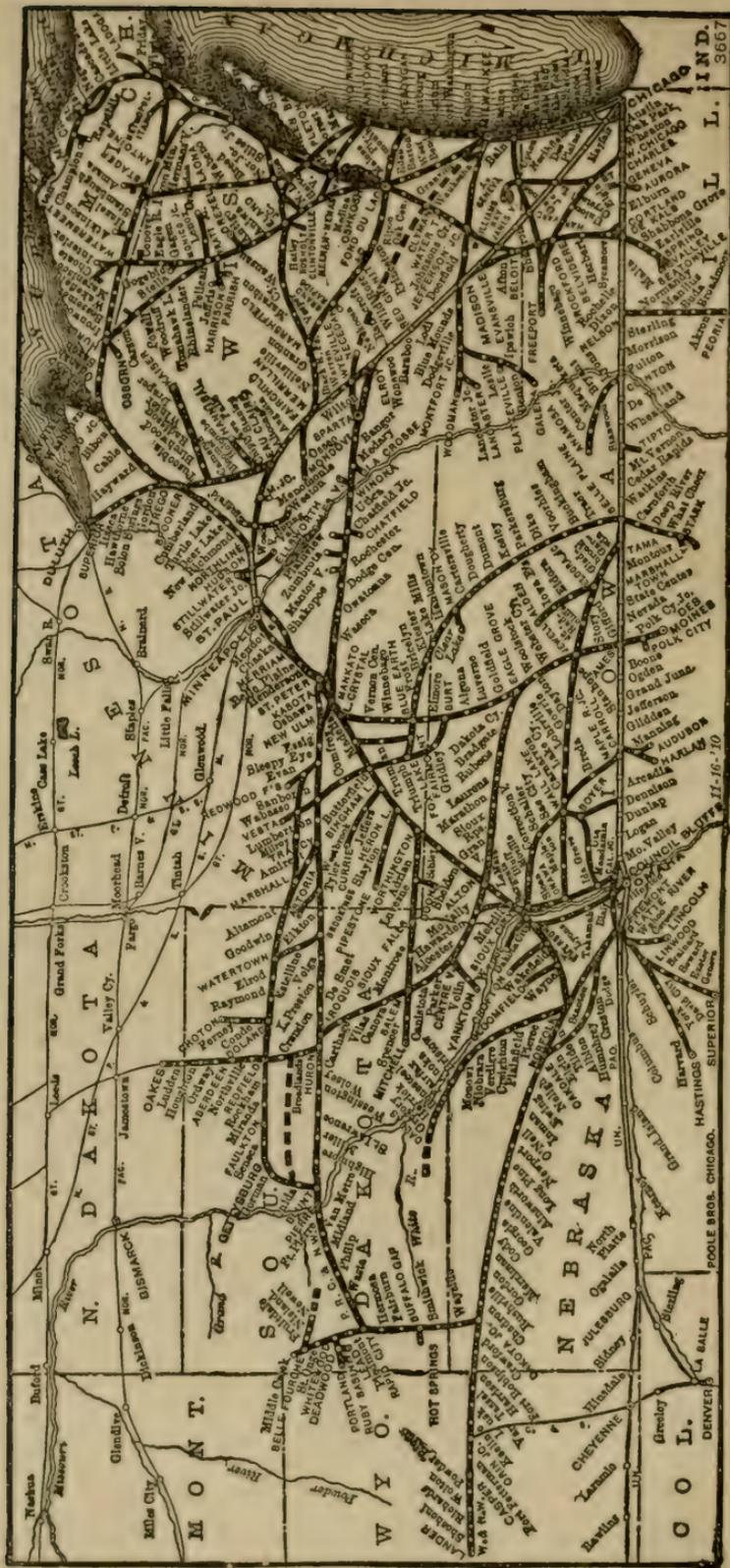
On the second year, or succeeding year's crops, I would consider an acre of alfalfa in this country worth more than an acre of corn. Last year my corn, which was better than the average in this vicinity, run about thirty bushels to the acre. Figuring the sale of this corn at \$.75 per bushel and that it cost me \$7.50 an acre to secure same in barn or granary, I would net \$15.00 to the acre. Figuring three and one-half tons alfalfa, valued at \$8.00 per ton, deducting \$1.00 per ton as total expense harvesting hay, would net me from an acre of alfalfa \$24.50 per acre; in other words an average acre of alfalfa compared with the average acre corn raised by me this year, would be worth \$9.50 more to me.

Weeds have appeared to a small extent, but by cutting the first crop at the proper time, usually from the 15th to 20th of June, the head of the weed is cut off before it is ripe and does not allow it to spread. It does not make so much difference what kind of ground is selected, that is either high or low ground, the chief point to consider is to secure ground where water will not stand for even a short length of time.

Before seeding alfalfa I generally take off two crops of small grain, and would not advise putting alfalfa in on new land. I plow the land extra deep, harrow it in good shape and then put in with nurse crop of oats, using about eight bushels of oats and from ten to twelve bushels alfalfa seed. After each cutting I go over the ground with harrow just to mulch it on top to hold the moisture.

Yours truly,

(Signed) FRED HOLCOMB.



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