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1958 Annual Report of the Dickinson Experiment Station

There has been no time in the history of North Dakota, when a well balanced Agricultural program for the average farmer or rancher was more essential than at present. This is borne out by the fact that we will have an estimated increase in the population of the United States of 230,000,000 by 1975, following the present trend they will be increasing the meat and meat products in their diet, while decreasing the cereal products. This will require an increase by 1975 of about 45 percent in meat and meat products with an increase of only 12 percent in our grain and grain products over the 1953 production. We produced 9 percent more wheat in 1953 than will be needed for our total population as projected for 1975.

In pointing the way towards a balanced agriculture we must carry out the best tillage conservation practices, crop rotations, use adapted high yielding grain varieties, and high producing grass and legumes to support our over all food and livestock feeding programs. Proper management of livestock would give some farmers and ranchers about twice the income they are now getting from their cow herd. This can be done without increasing the size of the breeding herd by feeding out the calves to slaughter grade beef. The net result would not be a new program well adapted to our whole state, that would augment our income more than any other single enterprise we could develop in North Dakota.

Many other things can be done to improve our agriculture, from which we presently do not derive full benefit, by pointing the way in our work at the Dickinson Experiment Station. This improvement in our agriculture will increase the income on the average farm and ranch. These demands upon us result in giving us an ever increasing program for the benefit of the people in then West River Area.

Our overall program at the Dickinson Experiment Station embodies the following:

LAND

Final payments on SW1/4 of Sec. 32-140-96 purchased from Joe A, Kostelecky in 1957. On this land which was purchased for $12,000.00 payments have been made in the amount of $5250.00, with payments in the amount of $2250.00 to be made on or about April 1, 1959; $2250 on or about April 1, 1960 and $2250.00 on or about April 1, 1961. These payments will be made from oil bonus payments of 25 cents per acre received each year on 643.78 acres of Station property leased to the Atlantic Refining Company, with the difference being made up by Station sales from grain and livestock.

Our expansion program calls for and increase in the acreage of range land in the Badlands, adjacent to the range land we already own. This additional land will need to be secured through the Forestry Service, with the approval of the local Grazing Association. We need 480 acres additional which would enlarge our range to graze 100 head of cows and their calves from about June 20, to October 1, of each year. With this additional acreage, we would divided our range into three pastures for the breeding season. As it is presently, we graze two-thirds of the herd on the range in the Badlands in two separate pastures. While one-third of the herd is kept in a separate native grass pasture which must be rented for the grazing season.

These separate pastures are essential for our herd improvement program and for the proper development of our livestock research program.

IMPROVEMENTS

During 1958, we painted all of the buildings on the Agronomy Farm, and the new barn and lots on the Livestock Farm. In 1959 our program calls for painting all of the buildings on the Livestock Farm.

The feed room at the hog barn was remodeled, with a 10 horse motor, 13 inch hammer mill and 1200 pound mixer being installed. This installation was made possible with the bringing of three phase electricity to the hog barn by the power company.

On the West and North of section five the fence was beyond repair, which made building of a new fence necessary. We replaced this with an electric fence, the old wire was removed along with approximately every other post, and one barbed wire was used to carry the current. The fence is operated with 110 volt current taken from the power line

through an electric fencer. We are using electric fences where new fences are constructed except in the small trial lots, we find this type of fence more successful than any type conventional barbed wire fence we have used on the Station.

In 1959, we want to build an additional holding pen at Pyramid Park. This should have been done in 1958, but we did not get at it before the weather became too cold for such work.

Some repair work must be done on the cabin at Pyramid Park. This includes lining the walls with a mouse proof composition board, repairing the floor, walls, and painting the building to prevent deterioration.

The scale house at Pyramid Park needs to have the roof shingled and be painted again this year.

The water hole or reservoir at Pyramid Park which had been enlarged in 1956 provided an adequate water supply for our herd during the 1958 grazing season, even though our precipitation was about 3.5 inches below normal.

The old barn on the Agronomy Farm was razed during the winter and early spring. This was rather a slow job but provided a lot of good lumber to be used on our future construction program. After removing the barn, the old silo pit was filled and the whole area leveled. This is the site on which we plan to build our new seed house when we receive funds for that purpose.

Some repair work was done on the machine shed at the Agronomy Farm which included siding up two openings where windows had been on the west end. This increased the strength of the structure and improved its appearance.

A new under-ground water line was laid below the frost-line from the well on the Agronomy Farm to the machine shed where it was connected to the water line leading to the Mess house. This line which replaced the old one that was rusted out was 157 feet long.

The dikes and ditches for our flood irrigation project on section 5 were completed and the entire area seed to grass. This irrigation system should have a good trial from the run-off this spring. We hope to irrigate from 10-12 acres with this system of dikes and ditches.

No settlement has as yet been made with the Atlantic Refining Company for the surface damage which resulted from drilling the oil well on NW1/4 of Sec. 32-140-96. We hope to reach a final settlement covering this damage on this early in 1959.

We built a hospital barn and six lots just North of 12 lots we already had on the Livestock Farm.

- The barn is 32 ft. wide and 60 ft. long with a 10 ft. alley and six box stalls on one side 10 ft. 6 inches deep and 8 ft. wide, with four stalls the same size on the other side along with one 16 ft. wide. In the front part of the barn we have a hospital room, plastered with cement so it can be thoroughly cleaned. On one side is a box stall 10 ft. 6 inches by 12 ft. for sick animals. Across the driveway on the other side is an operating room to be equipped with a squeeze chute and operating table. This entire room has a cement floor pitched 1/4 inch to the foot with drains into access pool. This hospital room to be used for sick animals, operations, and post-mortem examinations.
- The six sheds are 24 ft. wide and 20 ft. deep, with 8 ft. posts in the back, just high enough to make cleaning with a farm hand possible. There is a door in the west end of each lot leading into an alley for convenience in moving the cattle in and out of each lot. The lots extend on 60 feet from the shed with gates in the center line which can be opened for cleaning. Each lot is serviced with a Fairbanks Morse electric waterer. Feed troughs are built at the front and outside of lots for convenience.

Water was piped underground into the chicken house where an automatic waterer was installed.

The old barn on the Livestock Farm will be razed this spring with the lumber to be used for the construction of a machine shed, at the Agronomy Farm.

A machine shed 40 ft. x 70 ft. will be built on the Agronomy Farm during 1959. This machine shed will require very little new lumber.

MODEL PROJECTS

The model poultry flock was maintained again in 1958. The flock is handled as we believe a farmer or rancher

should handle his poultry flock with regard to size, care, and feeding.

The model garden was continued again in 1958. The project was improved in 1958, with to make even more improvements in 1959. This will make a more desirable garden for demonstration purposes.

Renovation of the shelter belt on the Livestock Farm was carried on in 1958 and will be continued through 1959. This shelter belt has made much improvement during the last two years.

A must for 1959 is the renovation of the old shelter belt North of the farmstead on the Agronomy Farm. This requires removing some of the trees, making a few replacements and cultivating the area between the rows.

Replacement of the spruce trees that did not survive from 1957 plantings were made in 1958 and will be made again in 1959 where needed.

Work will be continued in landscaping of the front yard on the Livestock Farm. This project is making good progress and will soon be completed.

The area where the old barn now stands on the Livestock Farm will be leveled and landscaped this spring. This will make a great change in the appearance of the whole farmstead.

INFORMATION

An effort is made to acquaint all farmers and ranchers with the work being carried on at the Dickinson Experiment Station. This information is released on radio, TV, through news articles, tours, classes, fielddays, along with that released in the Experiment Station Bimonthly.

WEATHER RECORDS

- The records kept for the Weather Bureau include:
- Maximum, minimum and 7:00 A.M. readings of temperature each day.
- Total wind velocity for each 24 hr. period.

- Free surface evaporation between April 1, and October 1.
- Daily precipitation
- A graph of the daily regular temperature changes and the changes made in the soil temperature at a depth of 8 inches.

Yearly Weather Report Follows:

In examining North Dakota precipitation records since 1800 there is found a slight rising trend to about 1900, followed by a general falling tendency to the late 30's. From about 1940 to 1951 there has been abundant precipitation. Conversely an examination of the temperature records shows a rising tendency to about the middle 30's when precipitation was at a minimum followed by a slow falling tendency during the following years when precipitation again showed an increase. The records, however, are not long enough to show a definite long range climatic change taking place. An outstanding period for extremes occurred between 1936 and 1945. During this decade, North Dakota experienced its highest and lowest temperatures and its driest and wettest years.

Precipitation	**Seasonal**	**Annual**	**From 1892-1957**		**1957**
	Apr. - July			**Average**	
1951	7.28	16.70	Jan.	.46	.41
1952	6.07	11.97	Feb.	.43	.21
1953	13.44	19.39	Mar.	.77	.32
1954	5.59	16.33	Apr.	1.28	2.59
1955	10.14	14.65	May	2.23	2.10
1956	7.30	12.70	June	3.51	6.61
1957	14.76	22.15	July	2.18	3.46
1941-Greatest	21.20	31.16	Aug.	1.81	1.49

1936-Least	2.03	6.72	Sept.	1.17	1.98
			Oct.	.89	1.94
66 Year Average	9.20	15.68	Nov.	.53	.88
			Dec.	.42	.16

GENERAL INFORMATION

Latest Killing Frost in Spring			**Earliest Killing Frost in Fall**		
1915	June 16	30°F	1917	Aug. 9	30°F
1957	May 23	30°F	1957	Sept. 13	30°F
Frost Free Season		Shortest of Record		Longest of Record	
1957 - 113 days		69 days - in 1915-1917		164 days - 1922	
				50 yr. av. - 118 days	
Temperatures		Lowest of Record		Highest of Record	
		1936 Feb. 16- 47°F		1936 July 6 114°F	
		1957 Jan 24, 25 -31°F		1957 Aug. 7 101°F	
1957 - Greatest 24 hr. Precipitation June 22 - 3.25 inches.					
January Temperatures					
	Precipitation	Low	High	Average Temperatures	Maximum Average	Minimum Average

1958	.13	0	50°F	24.3°F	36.5°F	12°F
1919	T		59°F*	27.8°F		
1916	.80	-44°F**		-3.6°F		
* All time high; **All time low: 1919-Highest average temperatures of record for January; 1958-Second highest temperatures of record for January.						

NORTH DAKOTA IN 1888

About 9: a.m. on January 12, without warning, a cloud arrived from the northwest and in a few moments the whole atmosphere was full of swirling snow, which was driven by a terrific 65-mile-per hour gale. The gale continued 14 hours, and the snow completely covered houses, barns, any stacks and everything else above ground. It is estimated that nearly 100 people lost their lives in this storm. This was one of the most severe blizzards of record and it extended southward into Texas.

1936

This was without question a freak year for weather extremes in North Dakota. It was the coldest winter, hottest summer, and the driest year. In February every station in the state reported a minimum temperature of 38° below zero or lower, in July every station in the State reported a maximum temperature of 106° or above.

1944

On May 23, a tornado struck neat Burnstad, Logan County. As it passed over Red Lake it sucked up thousands of gallons of water forming a waterspout. Burnstad residents, watching the funnel, reported that it suddenly turned from black to white as the water was carried into the air. (Waterspouts occur over the ocean about as often as tornadoes occur over land, but inland waterspouts are uncommon.)

On February 23, the snow on the Missouri River just south of Glencoe School was covered with cylinders of snow about 25 feet apart called snow rollers. A snow roller is a mass of snow shaped somewhat like a lady's muff, common in mountainous or hilly regions, and occurring when the snow is moist enough make it cohesive. It forms when the wind blows down a slope, picking up snow and rolling onward until it becomes too large or until the ground levels off too much for the wind to propel it further.

LIVESTOCK PROGRAM

- Improving the cow herd.
    - The beef herd wintering trials which were started in November 1, 1956, are being continued. The ration of 25 pounds of corn silage and 12 pounds of hay is used, which is standard for a 1100 pound cow.
    - This ration is designed to put all cows on an equal basis and enable us to cull the cows with low productivity. At the present time there are 98 cows in the breeding herd besides 7 heifers, on our moldy silage trial. These heifers may be added to the breeding herd for 1959.

A bull testing program is also being carried on with one-third of the herd being bred to same bull over a period of several years.

The cows are culled on the basis of defects, undesirable characteristics and productivity as indicated by light weight, low grade calves, in the order listed as rapidly as replacement heifers are available.

Heifers selected for replacement must be at least as heavy or heavier (with weight adjusted for age) than the average weight of all heifer calves raised each year. From among these heavier heifers replacement heifers are selected on the basis of being well marked, with the right type, conformation, thickness, quality and general appearance, using choice, good, medium and common as grades. The replacement heifers are fed to gain about 1

pound per day during the winter months.

Each fall at least one bull calf is fed out to determine his gaining ability before using him to breed the heifers before they go into the herd as replacements. These bulls which develop properly and have good gaining ability are used in our breeding program as they mature.

- Growing out and fattening beef cattle for market. The projects listed are being carried on in and attempt to provide a guide for our livestock men in feeding out the cattle they raise for slaughter where such a program fits their operation. It is to be used as an aid in developing one of the most important enterprises North Dakota has ever had, "Feeding out Cattle We Raise to Slaughter Grade."

Roughing calves through the winter to gain from .5 to 1 pound per day. To be followed by one of the following.

- Dry lot fattening following the wintering period, without being turned out on grass.
- To be grazed on early spring and good summer pasture followed by dry lot feeding.

Feeding calves in dry lot from weaning to slaughter.

- To include steers, heifers, and lots of mixed calves.
- Bred and open heifers.

Roughage rations to be used, with corn silage being the base since presently it is the most productive and palatable roughage in the Western two-thirds of North Dakota.

- Various limited grain rations to be used.
- All additives showing promise to be tested with roughage rations.
- Various pelleted feeds to be tried along with the corn silage.
- Quality feeds to be checked which includes.

Moldy silage and its effect on both fattening and breeding cattle.

Late maturing corn as compared to corn recommended for the area.

Grazing off corn as compared to the corn being harvested as silage and fed in dry lot.

SWINE PROGRAM

Breeding Program

- Improving the gaining ability of Yorkshires by selection and breeding. Only the best gaining gilts being saved from among these only gilts of the best Yorkshire and meat type to go back into the herd. Performance tested boars are used on these good gilts, to develop good gaining meat type hogs.
- A Duroc herd is maintained with the foundation stock coming from the NDAC.

Trials

- Pasture trials have been carried on which indicate alfalfa is the best permanent pasture and winter wheat seeded in the spring the best temporary pasture. New pasture trials to be continued when needed.
- Comparison of pasture and dry lot trials.
- New rations and various new supplements.
- Additives to be used when it appears they might be feasible.
- Two litters per year to be part of the hog program
- Cheap winter and summer quarters.
- Mechanical improvements in handling of feed preparation for hogs.
- Dry lots with cement floors.
- Use of injectable iron to prevent anemia and increase gains.
- Best method of preparing feed which includes, mixing, grinding, and pelleting.
- Best type of farrowing pens, and litter such as saw dust, shavings etc. to be used at farrowing time.

GRASS AND LEGUME INVESTIGATIONS

Hay yields

Selection of the best grass for North Dakota on basis of maintaining a stand and hay yields.

- A comparison of the quality of hay from seven varieties of intermediate wheat grass. These grasses produce a more leafy type of hay than crested wheat grass.
- A comparison of 14 varieties of brome grass from the standpoint of hay yield and maintaining stand.
- The best grass-alfalfa mixtures as compared to grass for hay alone.

Protein content of leafy grasses.

- High protein content of grass indicates a better quality of hay worth more to the livestock feeder.

Alfalfa

- A study of the most hardy and best hay yielding varieties of alfalfa. In this trial winter-hardiness is of prime importance.

Sweet clover.

- A determination of the best hay yields from the low-coumarin varieties.

Nitrogen fertilizer trials.

- The influence of nitrogen on old stands of crested wheat grass. If renovation to increase hay yield at a reasonable cost can be handled in this manner it has real value. A further determination is being made to check the protein in the hay following different applications of nitrogen fertilizer.
- The increase in grass yield through fertilization, by the addition of alfalfa to the grass mixture as compared to the application of mineral nitrogen.
- A determination of the increase in yield of native grasses by the application of nitrogen fertilizer. This has possibilities for the renovation of over grazed stands of native grass.

Crested wheat grass-alfalfa pastures for early spring grazing.

- A comparison of crested wheatgrass alone and crested wheatgrass and alfalfa for early spring grazing.
- These trials to be conducted as part the pasture rotation system with the early spring grass replacing native grass for early spring grazing between May 1, and June 20.

AGRONOMIC INVESTIGATIONS

Tillage practices and crop rotations, with all trials being carried over a period of years.

- Spring plowing as compared to fall plowing.
- Moldboard plowing as compared to one-waying, double disking and cultivating, in preparation of stubble for seeding to small grain.
- Disked clean corn land as compared to moldboard plowing for small grain.
- Best time for first tillage operation on fallow for maximum small grain yield.
- Best method of handling fallow for maximum weed destruction, moisture absorption and to prevent both wind and water erosion.
- A comparison of moldboard fallow with plowless or trashy fallow.

The following methods of fallow are being compared by observation, trash being incorporated in the surface soil, and on the basis of wheat yield.

- Moldboard plow
- Chemical fallow
- Treatment of fallow with narrow 6" to 8" shovels
- Treatment with medium 18" to 24" blades
- Using a wide 5 or 6 ft. shovel as the noble blade.

Small grain varieties

- For the purpose of comparing the yields of adapted varieties of:

    - Wheat
    - Oats
    - Barley
    - Flax
    - Rye

From this is determined the recommendation as the best variety of each crop for West River Area.

Crop Rotations

To determine the crop rotation best suited to the West River Area which includes:

- Continuous cropping
    - Alternate cropping
    - Two year grain rotation as compared to fallow
    - Three year rotations.
    - Four year rotations, including green manure.
    - Five and six year rotation with grasses and legumes.

Fertilizer trials.

- Fertilization of wheat on corn land and corn on stubble land along with the residual effect of these fertilizer applications on crop the following year.

Roughage trial including special corn projects.

- Trials comparing different corn varieties, and other forage crops which includes Sudan, cane, sorghum, oats, and peas.
- Corn spacing trial - to determine the best distance to plant the seeds apart in the row - this is a determination of the rate per acre to plant corn for both grain and silage.

Moisture conservation

- To compare the moisture in stubble at seeding time in the spring when the acreage was cropped to small grain the year before and handled under the following conditions.
    - Stubble left standing over without cultivation.
    - Stubble one-wayed in the fall.
    - Tilled with a noble blade in the fall.
    - Deep tillage with a spike tooth, which results in much of the straw left standing.

GENERAL FARMING OPERATION

We started the winter feeding period on November 1, 1958 with the following feed supply on hand at the Dickinson Experiment Station.