

**UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF CHEMISTRY AND SOILS**

In cooperation with the University of Nebraska State Soil Survey
Department of the Conservation and Survey Division

**SOIL SURVEY
OF
LINCOLN COUNTY, NEBRASKA**

BY

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and**

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SOIL SURVEY OF LINCOLN COUNTY, NEBRASKA

By A. W. GOKE, U. S. Department of Agriculture, in Charge, and E. A. NIESCHMIDT and R. C. ROBERTS, Nebraska Soil Survey

COUNTY SURVEYED

Lincoln County is in southwestern Nebraska. North Platte, the county seat, is about 280 miles west of Missouri River and 80 miles north of the Kansas-Nebraska line. The county is 54 miles from east to west and 48 miles from north to south. Its total area is 2,536 square miles, or 1,623,040 acres.

Physiographically the county is part of a vast plain that slopes gently toward the southeast. The Platte Rivers flow across the central part in a southeasterly direction. Their lowland belt divides the upland part of the county into three areas, one north of these streams, another south, and a third, which is comparatively small, between North Platte and South Platte Rivers in the western part of the county. Minor surface relief in the uplands has been produced by stream and wind erosion.

The nature and extent of erosion and the resulting topographic forms differ with the character of the surface materials. An area covered by sandy materials, the surface features of which have been produced largely by wind action, comprises a large proportion of the county and forms a distinct topographic division. Over most of the remainder of the county the surface materials contain a high percentage of silt or loess, and the topographic features have been produced largely by water action. Areas of the plain which have been only slightly modified by erosion are comparatively small.

Sand hills occupy nearly all the county north of the Platte Rivers and a large area in the southwestern part. Rounded, rolling, and choppy hills and irregularly distributed ridges of sand pitted in many places by blow-outs are characteristic features of the landscape. The ridges have a general northwest-southeast trend and are separated by basinlike depressions or narrow winding valleys.

Loess covers the greater part of the uplands in the southeastern part of the county, and large loess-covered areas also occur in the southwestern, western, and northeastern parts. The relief in these sections ranges from almost level to extremely rough and broken. Inextensive comparatively level areas occupy the highest positions and occur principally near the centers of divides where the loessial material has been least affected by erosion. Throughout most of the loess-covered part of the upland, the surface of the original loess man-

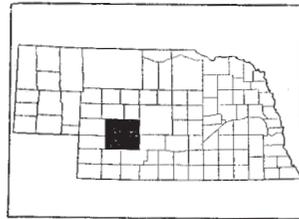


FIGURE 1.—Sketch map showing location of Lincoln County, Nebr.

tle has been completely dissected. Stream erosion has produced an intricate network of narrow steep-sided valleys, and sharply rolling hills and ridges have been formed. On the steeper slopes, slipping of the loess has produced a succession of contourlike shelves known as catsteps.

A few small areas of upland in the western, southwestern, and southern parts of the county have not been covered by either sand or loess but consist of tertiary materials composed largely of silty sand or a mixture of silt, sand, and gravel. The less eroded parts of these areas are nearly level, but the greater part of the land surface is the result of erosion on materials of unequal resistance and ranges from rolling to extremely rough and rugged. Some of the areas are characterized by rounded gravel-covered knolls and ridges.

The lowland belt, which divides the uplands of the county into two principal areas, includes the terraces and flood plains along the Platte Rivers. South Platte and North Platte Rivers cross the western county boundary and flow eastward for about 30 miles in roughly parallel courses. Their valleys are separated throughout the western part of the county by a narrow triangular-shaped upland spur which tapers to a point northeast of Sutherland, where the valleys unite. The streams, however, occupy separate channels to a point about 3 miles southeast of North Platte, where they join to form Platte River. This river flows in a general southeasterly direction. Its channel divides in numerous places to form many narrow elongated islands, the largest of which, Brady Island, is 15 miles long and about 2 miles wide.

North Platte Valley is about 3 miles wide. Its general surface is that of a low undulating alluvial plain. It is bordered on the north by high rolling hilly sand hills and on the south by rough, broken bluffs in which sandstone outcrops. Coarse gravel covers the shoulders of most of the slopes, giving them a more or less rounded appearance. The first-bottom part of the valley is low, flat, and poorly drained. It pinches off intermittently wherever the channel of the river sweeps against the sand hills or remnants of old terraces. The most extensive terrace remnant is south of the river, several feet above the flood plains. Its surface is almost level, except for a slight slope down the valley and toward the stream channel.

South Platte Valley is a level or undulating belt of lowland $1\frac{1}{2}$ miles wide at the western county line and 2 miles wide south of Sutherland. The bluffs on its northern border are similar to those on the south of North Platte Valley, but those on the south side are much steeper, often precipitous, and owing to an almost total absence of gravel have more angular shoulders. The first bottom is low, level, and poorly drained. During the summer no water flows over the sandy river bed. The only important terrace development is on the north side of the river near Sutherland.

In Platte Valley the most extensive terrace is south of Platte River, beginning at a point south of O'Fallons and continuing eastward into Dawson County. It increases in width eastward from one-half mile to about 3 miles. The western part of the terrace occupies long gradual slopes and is characterized by many low colluvial ridges composed of surface wash brought down from the upland. To the east it becomes more nearly level and streams traversing it are deeply entrenched, thus preventing the formation of colluvial ridges. The

surface of the terrace is about 150 feet below the general level of the adjoining uplands.

Small terrace remnants are north of Platte River between the sand hills and the first bottoms. The line of demarcation between these remnants and the upland is poorly defined in many places on account of the presence of colluvial deposits near the base of the sand hills, and the terraces have a rather pronounced slope toward the flood plains.

Rather extensive low and flat terrace developments occur between North Platte and South Platte Rivers in the western part of the county.

The flood plains in the Platte Valley occupy the lowest and most poorly drained situations. In general they are nearly level or undulating and are cut by numerous meandering abandoned stream channels, many of which are partly filled with sandy material.

The general slope of the county is downward toward the southeast. The elevation ranges from 3,000 feet above sea level in the western part to 2,600 feet in the eastern part. The highest elevations occur along the southern bluffs of Platte Valley.

The drainage of Lincoln County is effected through the Platte Rivers and their tributaries, except in the south-central and south-western parts where the surface run-off is carried to Republican River. All the county, except parts of the flood plains along the rivers and larger creeks and local basinlike depressions in the uplands, is well drained.

The first permanent settlement in the area now included in Lincoln County was made in 1853. In 1860 under the Nebraska Territorial Government the area was established and organized as Shorter County. It was reorganized in 1866 and called Lincoln County. The early settlers came largely from Eastern and South-eastern States.

The population of the county has increased from 17 in 1870 to 23,420 in 1920, when 89.2 per cent of the inhabitants were classed as native-born whites and the remainder as foreign-born whites. The foreign-born inhabitants are largely of Greek, Swedish, and Mexican descent.

North Platte, the county seat and only city, is near the center of the county. In 1920 it had a population of 10,466. The Union Pacific Railroad shops are located here. Towns and small villages in the uplands and in the Platte River Valleys furnish markets or shipping points for the communities in which they lie.

Lincoln County has good transportation facilities. A main line of the Union Pacific Railroad follows the Platte and South Platte Valleys across the central part, and a branch of this road follows the North Platte Valley. A branch line of the Chicago, Burlington & Quincy Railroad extends in a general east-west direction across the southern part of the county. These roads furnish good connections with outside points.

The county is crossed in several directions by State or Federal highways, the majority of which are either paved or surfaced with gravel. The county roads are of earth construction. They follow section lines except in the sand hills and rougher parts of the hard-land areas. The county is well served by rural mail delivery; telephones are in common use; and the public-school system is well developed.

CLIMATE

The climate of Lincoln County is intermediate between that of the humid and the arid regions. The average length of the frost-free season is 153 days, from May 1 to October 1. The latest and earliest killing frosts recorded, respectively, were on May 23 and September 10.

Weather conditions range from one extreme to the other during the year. Short periods of drought usually prevail in August and September, and occasionally they begin in the spring and continue to the middle of the growing season. The heaviest rainfall normally occurs during May, June, July, and August. July and August are characterized by very warm south winds. Cold northwesterly winds prevail during the winter.

Most of the precipitation falls as gentle rains, but occasionally a dashing rain occurs locally. The slow steady rainfall allows absorption of a considerable amount of water in the surface soil to a depth of several inches, where it is available for immediate use of the growing crops.

Table 1, compiled from records of the Weather Bureau station at North Platte, gives the normal monthly, seasonal, and annual temperature and precipitation for Lincoln County.

TABLE 1.—Normal monthly, seasonal, and annual temperature and precipitation at North Platte

[Elevation, 2,841 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1910)	Total amount for the wettest year (1915)	Snow, average depth
	° F.	° F.	° F.	Inches	Inches	Inches	Inches
December	26.7	72	-30	0.47	0.72	0.82	4.0
January	22.9	70	-35	.47	.34	.51	4.1
February	26.6	74	-35	.40	.02	1.11	5.8
Winter	25.4	74	-35	1.34	1.08	2.44	13.9
March	36.6	86	-21	.87	.19	2.23	7.3
April	48.6	95	2	2.15	.48	7.10	2.1
May	58.7	97	19	3.06	2.59	5.55	.4
Spring	48.0	97	-21	6.08	3.26	14.88	9.8
June	67.5	104	33	3.25	2.75	3.39	.0
July	72.9	107	41	2.68	.50	4.66	.0
August	70.8	105	36	2.46	2.02	4.23	.0
Summer	70.4	107	33	8.39	5.27	12.28	.0
September	62.1	101	21	1.50	.97	1.81	.0
October	49.7	94	4	1.15	.01	1.07	1.3
November	36.2	83	-25	.40	.11	.22	3.0
Fall	49.3	101	-25	3.05	1.09	3.10	4.3
Year	48.3	107	-35	18.86	10.70	32.70	28.0

AGRICULTURE

Cattle raising was the principal agricultural industry during the early settlement of Lincoln County. The land supported a luxuriant growth of grama, buffalo, bluestem, and bunch grasses. The range

was free, and cattle raising was very profitable. Later, as settlement increased, most of the cattlemen were forced to move their herds farther west. A large part of Lincoln County, however, is still used for grazing land, especially the rough broken areas south of the Platte Rivers and the sand hills north of these streams.

The first homestead in the county was established in 1869. The early settlers did not engage extensively in agriculture but devoted their time chiefly to the raising of vegetables and to maintaining trading posts for passing immigrants. For a few years following 1886 settlement was especially rapid. Land was taken up under the homestead, tree-culture, and preemption acts and through purchase from the railroads. During this time of rapid settlement the greater part of the hard lands in the county was taken up.

Prior to the great influx of immigrants, most of the population of Lincoln County was classed as urban. The principal farming district was along Platte Valley, where the growing of crops was most assured. In 1925, 73.5 per cent of the area of the county was in farms, the average size of which was given as 542.8 acres.

The agriculture of Lincoln County at present consists of diversified farming, combining the production of grain and hay with the raising of livestock. According to the 1925 census report the principal farm crops in 1924 were corn, wild hay, wheat, alfalfa, and oats, ranking in acreage in the order named.

According to the Federal census the value of all crops produced in Lincoln County in 1924 was \$4,078,601, and the total value of all livestock was \$4,149,052. Dairy products to the value of \$237,723 were produced, and poultry and eggs were valued at \$341,654.

Table 2, compiled from records of the United States Bureau of the Census, shows the acreage and production of the principal crops in Lincoln County in stated years.

TABLE 2.—Acreage and production of leading crops in Lincoln County in stated years

Crop	1879		1889		1899	
	<i>Acres</i>	<i>Bushels</i>	<i>Acres</i>	<i>Bushels</i>	<i>Acres</i>	<i>Bushels</i>
Corn.....	53	1,195	44,200	1,157,101	50,391	1,143,770
Wheat.....	19	75	8,257	114,325	26,208	148,440
Oats.....	52	850	6,092	131,635	3,184	62,200
Rye.....	10	200	1,333	17,490	5,166	39,210
Potatoes.....		7,053	1,695	163,876	936	56,386
Hay.....	10,043	12,858	48,295	53,834		
Tame.....					15,557	110,018
Wild.....					65,389	54,701
Sugar beets.....						
Coarse forage.....					915	1,155
		<i>Tons</i>		<i>Tons</i>		<i>Tons</i>
Crop	1909		1919		1924	
	<i>Acres</i>	<i>Bushels</i>	<i>Acres</i>	<i>Bushels</i>	<i>Acres</i>	<i>Bushels</i>
Corn.....	114,243	1,983,885	130,171	2,401,500	169,307	2,207,166
Wheat.....	15,994	247,879	61,684	783,522	39,492	576,341
Oats.....	17,561	455,046	11,312	268,585	14,015	315,879
Rye.....	1,547	16,218	16,835	143,508	8,010	75,640
Potatoes.....	1,624	76,273	990	36,617	859	57,882
Hay.....		<i>Tons</i>		<i>Tons</i>		<i>Tons</i>
Tame.....	121,899	140,841	121,076	140,745	158,778	113,620
Wild.....	132,834	117,531	165,001	112,713	131,375	
Sugar beets.....	623	5,187	3,827	35,546	1,478	14,684
Coarse forage.....	3,280	7,693	18,355	34,952		

¹ Principally alfalfa.

The adaptation of certain soils to particular crops is recognized by most farmers. In the hard-land sections of the county the land is used for growing grain crops and for pasturing work animals. The rougher parts of the county and the sand hills are used for grazing land, and the sand-hill valleys and poorly drained bottom lands are utilized for hay production. On the irrigated parts of Platte Valley alfalfa is grown. This crop was formerly grown extensively on the well-drained terrace soils south of the Platte Rivers, where crop yields were good, until winterkilling and droughts caused the crop to be abandoned. Reseeding has not been successful since, except on virgin areas and on areas that have never been seeded to alfalfa. A successful stand is usually obtained during favorable seasons, but the crop survives only one or two seasons. Reseeding of land under irrigation, however, has proved successful.

Corn occupies the largest acreage and is the chief cash crop on most farms where it is not fed to livestock. The average corn yield for the county is between 15 and 20 bushels to the acre. Large yields, ranging from 40 to 60 bushels to the acre, are obtained on the irrigated land in Platte Valley. On the owner-operated valley farms most of the corn is fed, together with beet tops, to cattle and hogs. On the few farms with silos from 15 to 20 acres of the corn crop is cut for silage each year. On most farms corn from a small acreage is cut for forage. Practically all the corn planted is of the dent varieties, mainly Reid Yellow Dent and Iowa Silvermine. Other varieties have been introduced recently, and fair yields are reported. Corn is grown on all soils in the county, except the rough broken lands, very sandy soils, and the wet bottoms of the Platte Rivers. During abnormally dry seasons the larger yields of corn are obtained on the uplands in the semihard land sections of the county.

Wheat ranks second among the grain crops in acreage. It is grown chiefly on the heavier soils of the county near Wallace, south of Sutherland on the uplands, on Garfield Table, and along the well-drained terrace south of Platte River. Although the yield of this crop varies with climatic conditions, the average yield for a period of years is about 15 bushels to the acre. In favorable seasons a yield of 30 bushels may be obtained. Turkey and Kanred are the principal varieties grown. Most of the grain is sold at local elevators.

The oat crop is grown principally for feed for work animals. This crop in general is less profitable than any other because dry seasons or spells of hot weather frequently prevent the grain from maturing. The best yields are obtained from the earliest seedings, provided climatic conditions are favorable.

Rye may be successfully produced under a wider range of soil conditions than any other grain crop. It is grown to some extent for hay and pasturage, especially on the sandy soils where it usually out-yields any other small-grain crop. When the crop is threshed, yields range from 7 to 15 bushels to the acre.

Most farmers devote a small acreage to sorghum, millet, and kafir, which are satisfactory crops on most soils, yields varying according to the fertility of the soil. As these crops are both drought and alkali resistant, they are ideal for western regions where the supply of winter forage is limited.

Most of the hay produced in Lincoln County is wild hay, cut chiefly on the poorly drained bottom-land soils and on the well-drained narrow canyon floors through the rougher parts of the uplands. The heaviest yields are obtained from the poorly drained areas, but the hay from the uplands and canyons is of finer quality and has a higher feeding value.

The farmers of Lincoln County consider alfalfa valuable as feed for livestock and as a soil improver. The crop is grown on soils which are heavy enough not to blow and which have lime in the subsoils. On the sandy soils considerable winterkilling occurs. The average yield of alfalfa is from 2 to 2½ tons to the acre, depending on the stand and the number of cuttings. From irrigated fields four cuttings a season are frequently obtained, but on most of the unirrigated soils the crop is cut three times. The largest acreages of alfalfa are on the irrigated lands between South Platte and North Platte Rivers.

The largest orchards in the county are on the well-drained terraces between North Platte and South Platte Rivers. Apples, cherries, plums, peaches, and some pears are produced. Wild plums, grapes, chokecherries, and raspberries, which grow wild chiefly along the larger streams and canyons, are abundant during favorable seasons. Among the smaller cultivated fruits strawberries and gooseberries do well.

Hog raising is an important branch of the livestock industry on the irrigated farm lands of Platte Valley. In the uplands the uncertainty of crop yields and other difficulties discourage the maintenance of large herds. In this section only sufficient hogs are kept to supply meat for family use, with a little for sale. On irrigated lands, where an abundance of alfalfa and corn can be produced, hog feeding should prove profitable. According to the Federal census for 1925, the total number of swine in Lincoln County was 55,811. Duroc-Jersey, Poland China, and Hampshire are the leading breeds.

Dairying receives attention only on farms near towns where milk can be sold. The largest dairies are near North Platte.

A few sheep are raised, mainly in the rough, broken areas of the county, and sheep raising is receiving increased attention.

Horses are raised on every farm, and several of the ranchers in the rougher and sandier parts of the county keep large herds. Most of the horses are western bronchos which have been improved by crossing with purebred stallions. A heavy type of draft horse is produced in the irrigated districts.

Poultry on most farms is an important source of income, as the local demand for poultry products is good. The principal breeds are Leghorn, Barred Plymouth Rock, Rhode Island Red, and Orpington. A few ducks, geese, and turkeys are raised.

On most farms there is a small garden, but truck products are not produced on a commercial scale except near North Platte.

The share-rental system is the principal form of farm leasing in Lincoln County. Under this system the tenant furnishes all farm implements, feed for livestock, seed, and labor, and takes care of the buildings and farm, in return for which he receives from two-thirds to three-fifths of the crops raised. In 1925, 55.7 per cent of the farms were operated by owners, 43.3 per cent by tenants, and 1 per cent by managers.

The average value of all farm property to the farm, including land, buildings, machinery, and domestic animals, was \$9,926 in 1880 and \$16,312 in 1925. In the latter year 71 per cent of the value of farm property was in land, 13.5 per cent in buildings, 3.9 per cent in implements and machinery, and 11.5 per cent in domestic animals.

Farm laborers are scarce at times, especially in those sections of the county where wheat is the chief crop. Some of the laborers are hired by the year, and in addition to a money wage are furnished with a house, garden, cow, and chickens. In beet-growing sections most of the laborers are Mexican and Japanese. In order to insure plenty of labor in the busy seasons, the sugar-beet companies have induced laborers to remain in the region by selling them small home sites at a nominal price.

SOILS

The most important characteristics of the soils of Lincoln County, particularly those which determine the valuable supplies of soil moisture, are the result directly or indirectly of climatic influences. The soil environment is controlled to a large extent by climate. The moisture supply in this region is not sufficient to support a forest growth but is very favorable to a grass growth. The grasses are the source (through decay) of the organic matter which imparts the black color to the surface soils.

A characteristic common to the upland soils is the accumulation of carbonates, principally lime carbonate, in the lower part of the subsoil. This high carbonate content is the result of the low moisture supply which, although sufficient to favor the accumulation of large amounts of humus, is not sufficient to leach the soil to any great depth. The carbonates, therefore, occur in only small quantities in the surface soil but in such abundance below a depth of 36 inches that an actual concentration is indicated. Other less noticeable or less prevalent characteristics which are a direct result of the soil-forming processes are discussed in subsequent pages of this report.

Conditions are most favorable for a grass vegetation and for the most complete weathering of the soils on well-drained smooth or gently rolling areas. Here the soil-forming processes have not been interrupted or retarded in their action, and the soils produced may be regarded as normally developed or mature for this region. The soils in Lincoln County which have developed under such conditions include those of the Holdrege, Dawes, Rosebud, Keith, and Hall series. These soils occur in the smooth level or gently rolling uplands in the northeastern, southeastern, and southwestern parts of the county and on the broad well-drained terraces of Platte River.

Over the greater part of Lincoln County, however, the soil-forming processes have not acted without interruption. Drainage has been excessive on rough, broken areas and restricted in low, flat depressions. In other areas, the porosity of the parent material has not been favorable for the retention of moisture and the easily removable soil constituents.

On the steeper slopes and sharper ridge cliffs, erosion has hindered deep soil weathering and the accumulation of organic matter, and the dark surface soils have been removed almost as rapidly as they have formed. Although the soils in such areas have not reached maturity they have made some progress toward maturity, the degree of development depending largely on the severity of erosion. In this group

of immature soils may be placed the Colby soils which occur extensively over the southeastern part of the county.

Immature soils of another group owe their lack of development to the character of the parent materials. Lincoln County lies on the eastern edge of and includes a part of the vast sand-hill region of Nebraska. Areas in which stream action has mixed the sandy material with the loessial soils of the county, in places completely covering the original plain to a depth of many feet, are not favorable to the retention of organic matter or other soluble material or to the concentration of clay in the subsoil. Only a few of the sandy soils, therefore, have attained normal development and maturity. With this group of soils belong the the vast areas of dune sand and the various sandy members of the Valentine, Anselmo, Bridgeport, and Sarpy series.

In the lower-lying basinlike depression in the uplands and on the poorly drained terraces, the surplus surface waters have had no outlet except that afforded by underground seepage. Such conditions have been favorable for the growth and decay of plants, the accumulation of organic matter, and the removal of the soluble salts to a considerable depth. The soils in such areas may be regarded as having reached a more advanced stage of maturity than the general climatic and vegetal environment of the region would warrant. This group includes soils of the Scott series in the upland depressions and of the Lamoure, Cass, and Laurel series on the poorly drained river flood plains.

The soils of Lincoln County have been grouped into series on the basis of similarity in color, structure, and other important physical properties and on the basis of their chemical properties, as far as these could be ascertained by field tests. The series are further subdivided into soil types on the basis of the texture of the surface soils.

In subsequent pages of this report the various soils are described in detail and their relation to agriculture is discussed. The accompanying map shows their distribution in the county. Table 3 gives the acreage and proportionate extent of the soils mapped.

TABLE 3.—Acreage and proportionate extent of the soils mapped in Lincoln County, Nebr.

Type of soil	Acres	Per cent	Type of soil	Acres	Per cent
Holdrege very fine sandy loam.....	96,256	6.2	Colby fine sandy loam.....	14,080	1.6
Basin phase.....	5,376		Broken phase.....	10,944	
Rosebud very fine sandy loam.....	36,800	2.3	Colby loamy sand.....	1,600	.1
Rosebud fine sandy loam.....	1,536	.1	Lamoure silt loam.....	40,448	2.8
Rosebud gravelly sandy loam.....	6,336	.4	Swamp phase.....	4,544	
Keith very fine sandy loam.....	16,704	1.0	Lamoure loam.....	15,040	.9
Hall very fine sandy loam.....	32,576	3.9	Lamoure silty clay loam.....	4,032	.2
Colluvial phase.....	28,544		Lamoure sandy loam.....	11,264	.7
Flat phase.....	3,904		Lamoure very fine sandy loam.....	2,432	.1
Hall silt loam.....	5,440	.3	Cass loam.....	21,888	1.3
Hall fine sandy loam.....	5,056	.3	Cass sandy loam.....	16,192	1.0
Hall clay loam.....	192	.1	Cass fine sandy loam.....	2,368	.1
Anselmo fine sandy loam.....	36,992	2.3	Cass clay loam.....	1,728	.1
Bridgeport very fine sandy loam, dark-subsoil phase.....	6,336	.4	Laurel very fine sandy loam.....	320	.1
Bridgeport sandy loam.....	6,592	.4	Laurel sandy loam.....	128	.1
Bridgeport loamy sand.....	21,248	1.3	Sarpy sand.....	2,624	.2
Bridgeport gravelly sandy loam.....	4,416	.3	Scott silt loam.....	3,456	.2
Dawes very fine sandy loam.....	19,776	1.2	Dune sand.....	661,888	40.8
Valentine loamy sand.....	110,400	6.8	River wash.....	4,032	.2
Valentine sand.....	120,704	7.4			
Valentine fine sandy loam.....	12,352	.8	Total.....	1,623,040	-----
Colby very fine sandy loam.....	62,656	14.0			
Broken phase.....	163,840				

HOLDREGE VERY FINE SANDY LOAM

The surface layer of Holdrege very fine sandy loam is dark grayish-brown loose very fine sandy loam, which has no definite structure but consists of a dustlike surface covering or mulch about 1 inch thick underlain by 3 or 4 inches of very dark grayish-brown or almost black material differing little in texture from the surface covering but having an irregular bedded or layered structure and a horizontal cleavage giving it a platy, laminated appearance. Beneath the laminated layer is dark-colored soil differing from the layers above in its slightly larger silt and clay content, greater coherence, and faintly columnar vertical structure. This columnar structure is the most notable characteristic on the face of road cuts through Holdrege very fine sandy loam and is one of the features distinguishing this soil from normally developed soils, such as those of the Hastings series. The material of this layer breaks into a coarsely granular, nutlike mass. These three layers are sharply defined and are very distinct throughout virgin areas of Holdrege very fine sandy loam. Their total thickness ranges from 8 to 12 inches.

The upper part of the subsoil, which ranges in thickness from 10 to 15 inches and lies between depths of 10 and 24 inches, is the zone of maximum compaction and of concentration of the fine-grained materials from above. The material consists of grayish-brown moderately compact silty clay loam having an imperfectly developed columnar structure similar to that in the lower part of the layer above. It is underlain in most places by lighter-colored friable silt or silty clay. All the layers described have been leached of their carbonates. The next lower layer, however, is the zone of maximum carbonate accumulation. It lies between depths of 3 and 4 feet and consists of very light grayish-brown floury silt or silty clay containing numerous seams, streaks, splotches, and fine winding threads of white lime. This layer directly overlies the loose floury light-gray or almost white silt or parent material, which is uniform to a depth of many feet. This material has a massive columnar structure, as may be seen in vertical bluffs and in road cuts. Lime is abundant but occurs chiefly in finely divided powderlike form uniformly distributed throughout the material. In many places a black horizon, darker than any other part of the profile, has developed between the zone of maximum compaction and that of maximum carbonate accumulation. This dark layer may be a buried soil. It occurs mainly on very flat areas, such as those found in sec. 32, T. 9 N., R. 30 W., and sec. 12, T. 9 N., R. 30 W.

Holdrege very fine sandy loam is rich in organic matter, but the content varies somewhat with the surface features. The organic layer is thicker on level areas and on gentle slopes where conditions have especially favored the accumulation of grass remains and where soil weathering has been least disturbed by erosion. In such places the surface soil is unusually dark and is from 14 to 18 inches deep. Around the margins of areas of this soil, however, where the slopes are rather steep, the depth to the organic layer gradually decreases until this soil merges with areas of the Colby soils. The soil has developed in part through weathering from the loessial deposits which once covered a large part of the county. The sandy texture of the surface soil is largely owing to the presence of wind-blown sand from more sandy regions.

Areas of this soil range from level to steeply rolling, but the greater part of the land is undulating or gently rolling. The more nearly level areas occupy some of the highest positions in the county and represent comparatively uneroded remnants of the original smooth loess plains. Drainage is good, as the slope is in most places sufficient to carry off surplus moisture and the porous subsoil affords ample underdrainage.

This is one of the best upland soils in Lincoln County. It is naturally strong, fertile, and retentive of moisture, and all crops common to the region produce well in favorable seasons. Nearly all the land is under cultivation to corn, oats, wheat, and alfalfa. Crop yields range widely, depending on the rainfall. The average yield of corn is about 25 bushels to the acre, of wheat about 15 bushels, of alfalfa between 2 and 3 tons from three cuttings, of oats about 25 bushels, of barley 20 bushels, and of rye 18 bushels.

Holdrege very fine sandy loam, basin phase.—The basin phase of Holdrege very fine sandy loam differs from the typical soil in having a deeper surface soil and greater thickness above the zone of lime-carbonate accumulation, which occurs in most places at a depth of 48 inches. The surface and upper subsoil layers are rich in organic matter and very dark in color.

Soil of this phase is very uniform throughout its occurrence. It occurs in basinlike depressions, the centers of which are occupied by small areas of Scott soils. These basins were at one time old lake beds within the loess plains. The largest areas of this soil are southeast of North Platte, on the Jack Morrow Flat, and in the northeastern part of the county.

Most of the land is under cultivation to corn, wheat, and oats. Crop yields average about the same as on typical Holdrege very fine sandy loam, though in wet years the average may be somewhat higher.

ROSEBUD VERY FINE SANDY LOAM

The profile of Rosebud very fine sandy loam shows four distinct layers. The first is the grayish-brown surface layer; the second is heavier brown or reddish-brown fine sandy loam; the third is grayish-yellow very silty material; and the fourth is grayish-yellow streaked with white lime carbonate. Beneath these layers is the yellow or grayish-yellow parent material which has been changed only slightly by weathering.

The first 2 inches of the surface layer is loose structureless very fine sandy loam, filled with an accumulation of fine organic matter and decaying grass roots. Beneath it in a few places there is a faintly developed laminated layer. Most of the material is single grained in structure and has no well-developed soil particles. It clods when wet but when dry breaks into single sandy particles. The next lower layer is the one of maximum compaction and corresponds in position to the brown horizon in Holdrege very fine sandy loam. It is firmer and harder to crush, however, contains a large amount of fine sand mixed with the heavy material, and has a more reddish color. The material breaks up into hard, sharp, angular clods when dry. This layer occurs between depths of 6 and 12 inches. Below it is the transitional layer between the zone of maximum compaction and that of greatest lime accumulation. The material is loose and

friable and is silt or very fine sandy loam in texture. It is not calcareous. The zone of lime accumulation underlying this layer contains more lime than any other layer. The lime occurs in splotches, streaks, and finely disseminated form. Below this layer is the fine sandy or silty parent material which is uniform in texture and structure to a great depth.

Areas of this soil are rolling or gently undulating and are modified by broad swales and low ridges. Drainage is good.

About 90 per cent of this soil is under cultivation, mainly to wheat, corn, and rye. Some sorghum is grown. Alfalfa and potatoes are minor crops. This is a good dry-farming soil, and in favorable years very satisfactory crops are obtained. Wheat produces from 20 to 30 bushels to the acre, corn from 15 to 30 bushels, oats from 20 to 25 bushels, and rye about 10 bushels. Sorghums, which are profitable forage plants, yield from 1½ to 2 tons to the acre. Rye is a dependable crop and furnishes excellent early spring pasturage before the native grasses are available. A few acres of alfalfa have been grown with moderate success.

This soil occurs in the largest wheat-producing section of Lincoln County, and wheat is the chief source of income on most farms. However, in recent years a better knowledge of corn production has encouraged a more diversified type of farming.

Land of this kind commands from \$40 to \$50 an acre, depending on improvements and distance to market.

ROSEBUD FINE SANDY LOAM

The surface soil of Rosebud fine sandy loam is dark grayish-brown structureless fine sandy loam. It is underlain, at a depth of about 12 inches, by a grayish-brown slightly heavier subsoil. At a depth of about 18 or 20 inches the weathered soil is underlain by the parent material which consists of calcareous sandstone and shale. The surface soil does not contain nearly so large a proportion of organic matter as the heavier soils of the Rosebud series, owing to the fact that considerable of the soil material has been transported by the wind from the adjacent sandy Valentine soils. The soil material breaks from a vertical wall into small prisms, from 1 to 2 inches in diameter, which crush into irregular sharp angular pieces.

Drainage is everywhere thorough and in a few places is very excessive.

This soil is very inextensive in Lincoln County. The largest area lies east of Red Willow Creek around Melton Ranch. About one-fourth of the soil is under cultivation, and the rest is used for pasture. Grass from about 10 acres is required to furnish enough pasturage to feed one steer during the grazing season.

ROSEBUD GRAVELLY SANDY LOAM

The surface soil of Rosebud gravelly sandy loam is covered by a 1-inch structureless dust mulch of dark-gray material which contains considerable decaying grass roots. Beneath this mulch is a layer of brown, porous, structureless, gravelly sandy loam containing very few grass roots and very little organic matter. At a depth of 9 inches this grades into structureless yellow gravelly fine sandy material containing less organic matter than the layer above. The material effervesces

with acid between depths of 24 and 28 inches, just above the sand and gravel substratum. The lime occurs as splotches and streaks and as a coating over the gravel. The gravel within the substratum range from 1 to 2 inches in diameter and consist principally of quartz and granitic materials. In very level areas the zone of lime accumulation occurs at a much slighter depth, ranging from 15 to 18 inches.

Rosebud gravelly sandy loam differs from Rosebud very fine sandy loam in the greater depth to the zone of lime carbonate, the absence of a layer of finer soil material, and the smaller organic content of the surface soil.

Owing to the porosity of the soil and to the sloping relief, drainage is excessive.

This soil occurs in the western part of the county on the divide separating North Platte and South Platte Rivers. Erosion has removed the original surface soil from this divide and dissected the slopes with numerous drainage ways, leaving the gravel and sand exposed.

Rosebud gravelly sandy loam has very little agricultural value. It is porous and droughty, and its surface configuration renders it unsuited to farming. Where the gravel deposits are thin, some grasses have obtained a foothold and afford fair pasturage. A greater acreage is required to support one steer than on the other Rosebud soils. Sand and gravel for local road building and concrete work may be obtained from areas of this soil. Most of the land is used for pasture.

KEITH VERY FINE SANDY LOAM

Keith very fine sandy loam has a 2-inch surface layer of loose structureless dark-gray very fine sandy loam which is filled with grass roots and decayed grass debris. This is underlain to a depth of about 6 inches by very dark grayish-brown friable very fine sandy loam high in organic matter, beneath which is heavy yellowish-brown very fine sandy loam or silt loam, which breaks in columnar pieces 3 or 4 inches in diameter and about 6 inches long. These pieces crush into irregular sharp angular particles from one-half to 1 inch in diameter, and on further reduction to fine powder the material changes from yellowish-brown to yellow. Insect casts, although few, are more numerous than in any other part of the soil. This is also the heaviest layer in the soil. Beneath it is a layer of easily powdered, uniformly yellow friable very fine sandy loam from about 4 to 6 inches thick. Grass roots are less numerous in this than in the overlying layers. At an average depth of 18 or 20 inches the soil effervesces with acid. At this depth is the zone of lime carbonate, which occurs in more or less abundance in splotches or streaks. The material of the lime zone is loose and floury and contains considerable fine silt. Its color is pale yellow.

Keith very fine sandy loam has developed from parent material similar to that giving rise to Holdrege very fine sandy loam, but the Keith soil differs from the Holdrege in having a slightly lighter-colored surface soil and in being thinner over the zone of lime carbonate. This soil is slightly darker colored than Rosebud very fine sandy loam but does not differ much from that soil in general profile characteristics and depth to lime accumulation.

The principal development of Keith very fine sandy loam is in the southwestern part of the county. The areas, which are smooth and

gradually sloping, occur as high loessial ridges extending in a southeasterly direction. The sloping surface affords good drainage.

About 80 per cent of the land is under cultivation, mainly to wheat, corn, and oats. Alfalfa and potatoes are minor crops. The remainder of the land is used as pasture. This soil is suited to dry farming. In favorable years very satisfactory returns are realized, wheat yielding 30 bushels, corn from 25 to 30 bushels, and oats 25 bushels to the acre.

This soil occurs in the main wheat-growing section of Lincoln County. Its selling price ranges from \$40 to \$60 an acre.

HALL VERY FINE SANDY LOAM

The surface layer of Hall very fine sandy loam consists of about 1 or 2 inches of very fine sandy loam filled with decomposed organic matter and decaying roots and vegetable débris. The structureless material is very dark grayish brown and forms a dustlike mulch over the surface. Virgin areas are covered with a dense sod of buffalo and grama grasses. The subsurface layer, which reaches an average depth of 7 inches, is very dark grayish-brown fine sandy loam having a very fine granular or single-grained structure. The material in this layer can be easily crushed into very fine particles between the fingers. Grass roots are abundant in the upper part of the layer. The third distinct layer, which consists of very fine sandy loam or silt loam, is compact in place but when taken from a vertical wall breaks into prismatic blocks from 4 to 5 inches in diameter and from 12 to 15 inches in length. The surface of the columns appears indistinctly granulated. In most places considerable single-grained material is between the granules. This layer contains many insect casts and dark rod-like intrusions which are filled with material that is either darker or lighter colored than the surrounding material. The lighter-colored material is brought from below and the darker colored from above. Grass roots are somewhat less numerous than in the upper layers. The change from this layer downward to the next or fourth layer is so gradual that the line of demarcation is arbitrary. The color grades from very dark grayish brown to dark yellow or yellowish brown, but in structure and all other features the two layers are similar. This layer, which has an average thickness of about 10 inches, is the transition zone between the darker part of the soil profile and the zone of lime accumulation. The fifth layer or zone of lime accumulation occurs at an average depth of 30 inches. The material is pale-yellow very fine sandy loam or silt loam and contains a few grass roots and a very few insect casts.

This is one of the most extensive soils in the Platte River Valley, and narrow strips extend along a few of the smaller streams of the county. The soil is fairly uniform except near upland escarpments where considerable colluvial material has been deposited. Areas are flat or very gently undulating. They occur on terraces above overflow. Drainage is good, as the slope toward the stream channels and down the valleys is usually sufficient to carry off the surplus moisture. This soil is nowhere subject to erosion.

This is an important agricultural soil in Lincoln County as it is naturally fertile. About 90 per cent is under cultivation, and the rest is included in farmsteads and pastures. On a few farms the land

is under irrigation from pumps. Corn and alfalfa are the principal crops, followed in importance by wheat and oats. As many as four cuttings of alfalfa are obtained in many years. Cattle raising is practiced extensively on account of the large acreage of alfalfa grown and the proximity of rough upland pastures. A few farmers keep pure-bred hogs and specialize in hog raising. All farmers keep a few hogs.

Corn yields an average of about 25 bushels to the acre, alfalfa from 2½ to 3 tons, wheat from 15 to 20 bushels depending on the rainfall, and oats about 20 bushels. Most of the small grain is sold in local markets, but the corn and alfalfa are used on the farms where grown and on near-by ranches.

Land of this kind is easily worked and maintained in good tilth. Four-horse teams and gang plows are in common use. On a few farms tractors are used to advantage.

The selling price of Hall very fine sandy loam ranges from \$80 to \$100 or more an acre. The higher prices are obtained for land seeded to alfalfa.

Hall very fine sandy loam, colluvial phase.—The colluvial phase of Hall very fine sandy loam differs from the typical soil mainly in having no heavy or compact layer in the subsoil. As a rule the layer containing lime is nearer the surface.

Development of this phase of soil is owing mainly to its position. It owes its characteristics to the colluvial and alluvial deposits of comparatively recent origin over which it has developed. The processes of weathering have not operated for a sufficient time to develop a typical Hall profile. As it occurs only at the base of the upland escarpment, in canyon bottoms, and along drainage ways that empty into Platte Valley, the soil is subjected to deposition of material from the adjacent uplands.

Areas are smooth and flat in the canyon bottoms, but elsewhere they are smooth with a decided slope toward the center of the valley. None of the soil is subject to rapid erosion.

This is an important agricultural soil, and most of it is cultivated or used for hay land and farmsteads. Corn and alfalfa, both of which return good yields, are the principal crops. They are fed to livestock brought in from the rough upland pastures during the winter.

Hall very fine sandy loam, flat phase.—The flat phase of Hall very fine sandy loam differs from the typical soil in the presence of a layer that is darker in color than any other part of the profile and in the occurrence of the lime accumulation at a greater depth below the surface. The dark-colored layer lies below the third layer and is similar in structure to that layer.

This soil occurs on a terrace south of South Platte River opposite O'Fallons, extending eastward to a point 1 mile west of Osgood School. From its general surface level there is a distinct drop of 15 feet at this point to a lower position on another terrace that continues eastward and may have been developed at a different period than the one farther west.

Areas of this soil occupy the most level parts of the terrace. Drainage is good, because of the low rainfall and high evaporation in this region.

About 95 per cent of this flat soil is used in the production of wheat, corn, and oats. Crop yields average slightly better than on typical Hall very fine sandy loam.

HALL SILT LOAM

Hall silt loam, to a depth of 7 inches, is very dark grayish-brown single-grained or very finely granular silt loam containing an abundance of organic matter. The 1-inch surface covering is a dense sod filled with buffalo and grama grass roots. Between depths of 7 and 12 inches is a black compact silty clay loam layer, which grades into dark grayish-brown silt loam continuing to a depth of 24 inches. Below this depth the material is dark-yellow or yellowish-brown very fine sandy loam, which contains an abundance of lime carbonate and effervesces freely with acid.

Hall silt loam differs from Hall very fine sandy loam in having a decidedly compact black silty clay loam subsoil layer and in that the zone of lime carbonate is nearer the surface. The material of the compact subsoil crushes into large irregular-shaped particles from one-fourth to one-half inch in diameter. When the clods are crushed, the resulting fine powder is lighter in color than the broken surface material. This compact layer probably prevents normal root penetration through the soil to some extent, but the agricultural value of the soil is not seriously impaired on this account.

The largest areas of Hall silt loam are south of Brady Island. Drainage is only fair, as the run-off of surplus moisture is not so rapid as in other members of the Hall series. None of the soil is subjected to stream erosion.

Hall silt loam is one of the leading agricultural soils of Lincoln County. Nearly all the land is under cultivation to corn, alfalfa, oats, and wheat.

In order to obtain good tilth, land of this kind must be handled under more favorable moisture conditions than the lighter soils.

Crop yields and the average price of the land are practically the same as for Hall very fine sandy loam.

HALL FINE SANDY LOAM

Hall fine sandy loam differs from Hall very fine sandy loam mainly in that the sand in the surface soil is largely fine sand rather than very fine sand. The large sand content is owing in part to deposition of coarser material and in part to the presence of sand blown in from the surrounding soils. The lower layers do not differ essentially from the corresponding layers of Hall very fine sandy loam. The most compact layer occurs below a depth of 30 inches and is directly underlain by the layer of lime accumulation. Below a depth of 50 inches the material is very sandy, and the lime content is low.

This soil occurs on well-drained terraces, the largest of which border Wild Horse Valley in the northeastern part of the county and Red Willow Creek below Wallace. Areas are flat or undulating.

Owing to its rather small extent, this is not an important farming soil, but it is well suited to all crops commonly grown. Good yields are obtained in most seasons. About 90 per cent of the land is under cultivation, and the rest is in pasture.

HALL CLAY LOAM

The 8 or 10 inch surface layer of Hall clay loam is dark grayish-brown clay loam containing a large amount of organic matter. The

subsoil consists of black or grayish-drab heavy compact clay which is sticky and plastic when wet and very hard when dry. In structure this layer is similar to the corresponding layer of Hall silt loam. The lime-carbonate zone, which begins at a depth ranging from 24 to 30 inches, is pale-yellow loose floury highly calcareous silt loam or very fine sandy loam.

Areas of this soil are flat, and drainage is variable. In normal years the surface slope is sufficient to carry off surplus moisture. It is not an extensive soil. Small areas are in the eastern end of Platte Valley.

Most of the land is under cultivation, mainly to corn, wheat, oats, and alfalfa. During normal years the yield of corn is from 18 to 25 bushels to the acre, of wheat from 12 to 15 bushels, of oats from 15 to 25 bushels, and of alfalfa from 2 to 2½ tons from 3 cuttings.

Land values of Hall clay loam range from \$50 to \$150 an acre, depending largely on nearness to markets and on improvements.

ANSELMO FINE SANDY LOAM

The 2-inch surface layer of Anselmo fine sandy loam is grayish-brown single-grained fine sandy loam. The subsurface layer, which extends to a depth of 6 inches, is slightly darker, being dark grayish-brown fine sandy loam containing sufficient silt, clay, and organic matter to bind the particles together loosely. The material in this layer breaks into small, soft, irregular-shaped clods. The next lower layer, which extends to an average depth of 19 inches, is the most distinctive in the soil. It is firmer and more coherent than the layers above and below. The texture ranges from fine sandy loam to silt loam. When dry the material is very hard and breaks away from a vertical wall in large irregular-shaped pieces which crush only under considerable pressure. It contains a large proportion of fine sandy material, and the small sand grains seem to be cemented together by colloidal material. On crushing, the fine sand grains separate from each other and form a loose structureless mass. In places where this layer contains a larger proportion of silt and clay, it is composed of granules two-fifths inch in diameter. Large clods taken carefully from this layer appear to have a dark varnishlike coating which consists perhaps of dark organic matter brought down from the surface layer. Beneath this layer is a substratum consisting of loose friable yellow fine sand which does not effervesce with acid. Below a depth of 30 inches and extending to a great depth the sandy material is uniform in texture and color.

Areas of Anselmo fine sandy loam occur between the sand hills and adjacent to the heavier soils of Lincoln County. This soil is commonly designated by local farmers as "semihard lands of the sand hills." One area, which is southeast of Wallace, forms a belt from 1 to 1½ miles wide between the sand hills and the hard lands on the west. Other important areas are north of Odencrantz Table, in Myrtle and Whittier Precincts, and northeast of Wellfleet. An area southwest of Sutherland beyond the Platte Valley lies within the hard-land area. It has developed from coarser material than the other areas and is slightly lighter textured, but the difference was not sufficient to warrant separation.

Areas of Anselmo fine sandy loam are level or undulating. Their general elevation is lower than that of the surrounding sand hills. Drainage is good, owing to the sloping surface and to less extent to the porous substratum.

This is considered the most valuable agricultural soil in the sand-hill section of the county. The land is well suited to corn, even in dry seasons. Corn yields range from 15 to 20 bushels to the acre. Wheat, which is commonly grown in rotation with corn, is seeded between the corn rows during the fall.

Land of this kind sells for \$40 or \$50 an acre.

BRIDGEPORT VERY FINE SANDY LOAM, DARK-SUBSOIL PHASE

The surface layer of Bridgeport very fine sandy loam, dark-subsoil phase, is friable dark grayish-brown very fine sandy loam containing small amounts of gravel. In the upper part of the layer a faint laminated structure may be developed. This layer is high in decomposed organic matter and contains many grass roots. Insect casts, averaging one-fifth inch in diameter, are numerous, and most of them are filled with slightly darker material than the soil mass. Between depths of 10 and 18 inches the soil material is friable brown very fine sandy loam. It breaks from the soil wall in large irregular pieces which can be crushed easily when wet. Insect casts are as numerous in this layer as in the one above. The next lower layer is black or dark grayish-brown heavy silt loam, which is darker than any other part of the soil. The material breaks away from a vertical wall in large irregular clods. A varnishlike coating occurs on the broken surface. The number of insect casts diminishes with depth, and in the lower part of the layer where sufficient carbonates occur to effervesce with acid, there are no casts. This layer abruptly overlies the substratum of sand and gravel at a depth of about 32 inches.

This soil differs from the Hall soils in being browner throughout and in having a calcareous layer in the heaviest material of the profile instead of in the lighter-colored and most friable material. In this soil a substratum of gravel and sand occurs at a depth of about 32 inches and in the Hall soils it lies between depths of 15 and 20 feet. In Bridgeport very fine sandy loam, dark-subsoil phase, gravel occurs in small quantities in the upper part of the surface soil and in the Hall soils the surface soil is free of coarse material.

Areas of this soil are level or undulating and in general occupy slightly higher positions than the other Bridgeport soils, except Bridgeport sandy loam. Owing to its position on a terrace in the valley between the two rivers surface drainage of the land is good. The largest areas are northeast of Nichols and north of O'Fallons.

This is considered one of the most important farming soils of Platte Valley. Most of the land is irrigated. Corn, alfalfa, sugar beets, oats, and potatoes are the principal crops. Corn yields range from 40 to 50 bushels to the acre. Alfalfa is very extensively grown under irrigation, and valuable returns have been obtained from this crop on most farms. Oats, which are grown only as feed for work animals, produce from 20 to 40 bushels to the acre, and potatoes under irrigation return from 80 to 100 bushels to the acre. A few large apple orchards, from which large crops of fruit have been obtained, are on this soil.

Land of this kind sells at prices ranging from \$125 to \$150 an acre.

BRIDGEPORT SANDY LOAM

The surface soil of Bridgeport sandy loam is covered with a thin layer of humus accumulated from decayed grama, buffalo, and salt grasses. Gravel ranging from one-fourth to one-half inch in diameter are scattered over the surface but not in sufficient quantities to interfere with cultivation. Beneath this covering and continuing to a depth of about 18 inches the material is friable single-grained grayish-brown sandy loam, which contains small quantities of fine gravel and coarse sand composed chiefly of quartz and feldspar. This layer grades into light-brown or yellowish-brown incoherent loamy sand which extends to a depth of about 40 inches, where it is underlain by the coarse sand and gravel substratum. In most places none of the soil material contains enough lime carbonate to effervesce with acid.

This soil occurs between South and North Platte Rivers in narrow irregular-shaped areas bordering the first bottoms of North Platte River and the small stream channels of Platte Valley. In general it lies slightly higher than the surrounding soils and appears to be a natural levee built up by stream deposits. The most extensive areas are northeast of Hershey. Areas are level or gently undulating, and surface drainage is good.

Practically all the land is under cultivation, chiefly to corn, alfalfa, and sugar beets. Corn yields between 35 and 50 bushels to the acre, alfalfa from 2 to 3½ tons of hay from three cuttings, and potatoes as high as 100 bushels. Most of the land is irrigated.

BRIDGEPORT LOAMY SAND

In virgin areas Bridgeport loamy sand consists of grayish-brown or dark grayish-brown rather incoherent fine or medium sand which remains uniform in texture and color to a depth below 3 feet. The surface 3 or 4 inches is in many places slightly darker than the remainder of the soil, owing to the presence of small amounts of organic matter. The soil contains sufficient lime to effervesce with acid below a depth of 8 or 10 inches.

Areas of this soil are nearly level or undulating. In many places the surface configuration has been altered by wind, and a hummocky and billowy appearance has been produced. In a few places a dune-like configuration has developed, but such areas are too small to be indicated separately.

Tracts of this land slope gently toward the bottom lands. Owing to the slope and to the porosity of the soil, drainage is good. The soil is extensive near the head of Red Willow Creek and along the northern edge of Platte Valley. In Platte Valley it occupies a terrace strip ranging from one-fourth to one-half mile in width.

This land is used mainly for pasture. When cut for hay the grasses yield from one-fourth to one-half ton to the acre. From 8 to 9 acres are required to pasture one steer. Corn, which is practically the only cultivated crop grown, gives fair yields. Rye, sorghum, and potatoes do well.

As this soil has a tendency to drift, care must be taken not to disturb it often, especially in cultivated areas. The application of liberal quantities of manure and straw aid in preventing soil drifting.

Land of this kind commands from \$10 to \$15 an acre, depending on location and distance from market.

BRIDGEPORT GRAVELLY SANDY LOAM

The surface soil of Bridgeport gravelly sandy loam consists of brown or grayish-brown gravelly sandy loam about 18 inches thick. This is underlain by grayish-brown calcareous gravelly sandy loam containing large quantities of coarse sand and gravel. At a depth ranging from about 30 to 40 inches the substratum of still coarser material is reached. This extends to a great depth.

An extensive area of this soil occupies a low colluvial terrace bordering both sides of the upland ridge between South Platte and North Platte Rivers. Another important area borders the lower part of Birdwood Creek.

Torrential rains have carried considerable coarse gravel from the adjacent upland over the surface of this soil. Owing to the exceedingly open structure of both surface soil and subsoil, drainage is in most places excessive and the soil is droughty.

Under irrigation or good farming methods some crops, such as wheat, corn, garden truck, alfalfa, and sugar beets, can be successfully grown on this soil. The acreage of alfalfa is largest north of the upland divide between the two rivers, where the land is under irrigation.

Land of this kind sells at prices ranging from \$10 to \$30 an acre, depending on location, improvements, and utilization.

DAWES VERY FINE SANDY LOAM

Dawes very fine sandy loam consists of the following layers: (1) A surface dust mulch, ranging from 1 to 2 inches in thickness and consisting of loosely deposited material composed of decayed grass roots and other plant debris; (2) a layer, extending to a depth of 6 inches, of very dark grayish-brown or black very fine sandy material, the upper part of which is faintly laminated but most of which is single grained; (3) between depths of 6 and 12 inches, the darkest part of the soil, ranging in color from very dark grayish brown to almost black, consisting of small rounded subangular aggregates ranging from one-sixteenth to slightly more than one-fourth inch in diameter and filled with numerous insect casts and dark intrusions; (4) a grayish-brown or brown layer, the zone of maximum compaction, which contains larger quantities of finer material than any other part of the soil and which breaks into small prismatic blocks which are further reduced to irregular-shaped angular clods; (5) a noncalcareous transitional layer which is developed between depths of 22 and 30 inches and in which the material is friable and easily reduced to a fine silty mass; and (6) the zone of lime accumulation in which the material is similar to the corresponding layer of Holdrege very fine sandy loam. The substratum of this soil, unlike the Holdrege substratum, consists of calcareous sandstone and limerock.

Dawes very fine sandy loam is closely associated with Rosebud very fine sandy loam. It occurs on low, flat, or depressed areas. It is a very productive soil and is considered one of the best wheat-producing soils in Lincoln County. Wheat, corn, and oats are the principal crops grown. Some alfalfa is grown with fair success.

Land of this kind sells at prices ranging from \$50 to \$100 an acre, depending on location and distance to market.

VALENTINE LOAMY SAND

The surface soil of Valentine loamy sand consists of grayish-brown or dark grayish-brown loamy sand from 2 to 3 inches thick, underlain by brown or grayish-brown loamy sand continuing to a depth of 12 inches. Beneath this is the gray or yellowish-brown loose incoherent sand subsoil. Neither surface soil nor subsoil contains enough lime to effervesce with acid. This soil differs from Valentine sand in having a greater content of humus and a slightly darker-colored surface soil.

Areas of this soil are flat or undulating. They occur in the dry sand-hill valleys, somewhat below the general level of Valentine sand. The most extensive are near Dickens, along the highway between North Platte and Tyron, McPherson County, in Sellers, Kem, and Well Precincts, and at the head of Pawnee Creek. Drainage is good, even though no surface drainage system is established. Moisture disappears downward readily through the porous soil.

This is the most important agricultural soil of the sand-hill region. In early times it provided hay meadow for the ranchers. At present about 70 per cent of the total area is under cultivation, mainly to corn, rye, and oats. The yield of corn is from 10 to 12 bushels to the acre during normal seasons. Rye, which is sown between the corn rows, yields from 8 to 12 bushels to the acre.

The selling price of Valentine loamy sand averages about \$5 an acre. The soil is usually sold with other sandy land.

VALENTINE SAND

The surface layer of Valentine sand to a depth of 3 inches is loose incoherent dark grayish-brown sand. It is underlain by grayish-brown sand which grades into grayish-yellow sand at a depth of about 15 inches. The material is loose, incoherent, and noncalcareous.

This soil occupies a few rolling and moundlike areas, principally in the higher parts of the sand hills. It supports a more stable vegetal cover than the dune-sand areas. Owing to its great porosity, the soil is excessively drained.

Valentine sand is of little value for crop production because of the great danger of soil drifting after a short period of cultivation. Very little of the land is under cultivation. The most practical use that can be made of it is for pasture, and if the pastures are carefully protected from overgrazing the quality of the feed is fairly good. The average pasture supports one cow to every 6 or 8 acres.

VALENTINE FINE SANDY LOAM

The surface soil of Valentine fine sandy loam to a depth of 2 or 3 inches is dark grayish brown. It grades below into grayish-brown fine sandy loam containing a large proportion of fine sand and very fine sand and sufficient silt and clay to prevent excessive wind erosion under normal conditions. At a depth of 15 or 18 inches, the color becomes slightly lighter and the soil material somewhat sticky. Valentine fine sandy loam differs from Rosebud fine sandy loam chiefly in the low lime content of its subsoil.

Areas of this soil occupy valleys and basinlike depressions within or near sand-dune areas. The soil is most extensive in the northern and central parts of the county. It is not so excessively drained as

Valentine sand, and the surface features are more favorable for the accumulation and retention of moisture. The position of the soil also favors the accumulation of more organic matter than is possible in the sandier members of the series.

Valentine fine sandy loam has only a small total area and is not important agriculturally. As a rule, however, it is more valuable than the surrounding soils and is better suited to corn. It must be managed carefully to prevent drifting by the wind. The greater part of the land is included in stock farms. The native vegetation consists of grama grass, buffalo grass, needle grass, and a scattered growth of bunch grass. Grasses make a better growth than on the more sandy soils. Corn yields vary widely from year to year, ranging from 15 to 30 bushels, depending on the rainfall. Potatoes and oats do well, but are grown mainly for home consumption.

COLBY VERY FINE SANDY LOAM

The 2 or 3 inch surface layer of Colby very fine sandy loam consists of grayish-brown or dark grayish-brown loose single-grained material composed largely of very fine sand and silt, with a small amount of organic matter. The organic matter is in different stages of decomposition, the greater part remaining more or less fibrous. This layer is underlain by a 3 or 4 inch layer of dark grayish-brown very fine sandy loam similar in texture and structure to the layer above but slightly darker in color, as the organic matter is slightly more abundant and more thoroughly decomposed. The next layer, lying between depths of 5 and 18 inches, consists of grayish-brown very fine sandy loam. This layer is distinguished from those above and below by its greater coherence and cloddy structure. It contains a larger proportion of fine material than any other layer. The material breaks up into small angular or partly rounded clods from one-half to 1 inch in diameter. These clods are firm but may readily be crushed and reduced to a powder. This layer is friable throughout, having no resemblance to a claypan. It is underlain by the parent loess, a grayish-yellow or almost white loose floury highly calcareous silt.

This soil varies considerably in different parts of the county. Typical areas occur where the land is level enough to insure stable surface conditions. In places, however, the surface soil is shallow and directly overlies the unweathered loess. In other small included areas the dark-colored layer has been entirely removed by erosion, and the yellow silt is exposed.

This soil occurs chiefly in the southeastern part of the county. Areas are gently rolling or hilly, and drainage is good throughout. In the more hilly sections the run-off is rapid, and erosion is beginning to dissect the land deeply.

This is a good farming soil. It is more retentive of moisture than the Holdrege soils, and during dry periods corn appears much greener than on the heavier soils of the county. About 50 per cent of the land is under cultivation, and the rest is used for pasture and hay land.

Colby very fine sandy loam, broken phase.—The broken phase of Colby very fine sandy loam includes those areas which are so rough and broken as to be unfit for agricultural use except as pasture. Surface run-off has removed the organic matter almost as fast as it has formed and the soil consists largely of light-gray or pale yellowish-

gray floury calcareous loess, only the upper 2 or 3 inches of which is darkened by organic matter. In many places the organic material has been entirely removed, exposing the loessial deposit which in most places has a higher sand and slightly lower lime content than the loess underlying the broken phase of Colby fine sandy loam. In most places the texture is very fine sandy silt to a depth below 4 or 5 feet. Locally the material contains insufficient lime to effervesce with acid above a depth ranging from 30 to 36 inches, but most of the soil is more or less calcareous either at the surface or within a depth of 5 or 6 inches. Scattered rust-brown splotches, streaks, and seams are common throughout the loessial deposit.

This broken land is used only for pasture. About 5 or 6 acres for each steer seems to be the feeding capacity for grasses growing on this soil. The principal grasses are bluestem and buffalo grass. A few herds of sheep have been raised profitably on this soil.

Land of this kind sells for \$8 or \$10 an acre.

COLBY FINE SANDY LOAM

Colby fine sandy loam differs from Colby very fine sandy loam mainly in having a less coherent fine sandy loam rather than very fine sandy loam surface soil of low organic-matter content. The underlying layers are similar to the corresponding layers of other sandy Colby soils.

Areas of this soil occur between the loess plain and the sand hills. The largest are at the heads of tributary branches in Yucca Valley, along the bluffs of Red Willow Creek, and in the southwestern corner of the county. Areas range from gently rolling to hilly but are mainly sharply rolling and broken by narrow sharply cut valleys along the larger drainage ways. Drainage is everywhere good and in the rougher areas is excessive.

This land has a low agricultural value, and none of it is cultivated. Nearly all of it makes fair pasture. The native vegetation over the greater part consists mainly of sand grass and stipa or needle grass, but in places bluestem and grama make a good stand.

Colby fine sandy loam, broken phase.—The broken phase of Colby fine sandy loam includes areas so dissected by stream erosion as to be unsuitable for any purpose except grazing. Where the land has been undisturbed for a sufficient time to allow soil development, the layers are similar to those in typical Colby fine sandy loam. Over the greater part of the phase the surface layers have been removed almost as fast as they have formed, causing the darker layer to be thin and, in spots, entirely lacking.

Areas of this soil are rough and broken, and drainage is excessive and erosion severe.

This land is used only for pasture. From 4 to 5 acres are required to support a steer during the grazing season, from June to October.

COLBY LOAMY SAND

The surface soil of Colby loamy sand is loose dark-gray loamy sand from 10 to 15 inches thick. It is underlain by uniformly loose grayish-yellow sand which grades into the calcareous parent loess material at a depth of about 36 inches.

Colby loamy sand occurs in only a few small areas in the north-eastern part of the county and along West Birdwood Creek. The areas lie near the sand hills from which sand has drifted and become mixed with loess. In most places sand has covered the loessial parent material to such a depth as to make separation of this soil from the Valentine soils difficult.

This soil, which is used chiefly for pasture, has an average feeding capacity of 7 or 8 acres for each steer. Areas are hummocky or bilowy, and drainage is good.

The average price of land of this kind ranges from \$6 to \$8 an acre.

LAMOURE SILT LOAM

The surface soil of Lamoure silt loam is covered with a thin layer of silt loam containing much organic matter accumulated from decaying grass roots. Below this covering to a depth of about 4 inches the soil is black friable very calcareous silt loam, also containing an abundance of fibrous grass roots of the sod-forming type of bluestem. When moist this material is extremely sticky, and when dry it breaks from a vertical wall in round, granular, easily crushed pieces from one-tenth to one-fifth inch in diameter. Beneath this layer the material is very calcareous heavy black silt loam or clay loam of high organic-matter content. When wet it is sticky but when dry it breaks from a cut into prismatic blocks from 1 to 4 inches in diameter, which crush easily into small rounded particles similar to those in the layer above. Insect casts and worm burrows are very numerous in this layer. Below a depth of 15 inches is mouse-gray material, which is abruptly underlain, at a depth ranging from about 30 to 36 inches, by the substratum of sand and gravel. This lighter-colored layer is similar in structure to the material above except when the dry larger prismatic blocks, which are from 4 to 6 inches in width and 12 inches long, break off from the vertical wall. The substratum of gravel and sand consists of quartzitic and granitic water-assorted material.

This soil occurs in the first bottoms of the Platte Valley and is subjected to occasional overflow during wet periods of the year. During dry periods surface drainage is considered good, as the slope is sufficient to provide run-off of surplus water. Owing, however, to the proximity of the water table to the surface, areas of this soil may remain saturated for a long time.

Lamoure silt loam is used principally as hay land. It is naturally fertile and where adequately drained is well suited to the production of corn and alfalfa. The wild-hay grasses include bluestem, Indian grass, and other wet-meadow grasses. Sweetclover also grows wild.

The selling price of this kind of land is between \$40 and \$45 an acre, depending on distance to market.

Lamoure silt loam, swamp phase.—The surface soil of the swamp phase of Lamoure silt loam is black sticky silt loam 4 inches deep which grades into wet sticky black silt loam impregnated with organic matter and peatlike material. This is underlain at a depth ranging from 36 to 42 inches by very fine sandy loam which becomes coarser with depth. The soil material effervesces freely with acid throughout.

This soil occupies small very poorly drained or swampy areas. One is north of Hershey on the North Platte River bottom and others lie along Pawnee Creek and Whitehorse Creek. The surface

is covered with slough grass, cattails, and other wet-meadow varieties of grasses and sedges.

Drainage of this swamp phase of Lamoure silt loam could be gradually improved by ditches, after which the land could be used for hay meadows.

LAMOURE LOAM

Lamoure loam differs from Lamoure silt loam only in the texture of the upper few inches of the surface soil.

A large area of this soil is northwest of Maxwell. It is bordered on the north by the sand hills, and the surface texture of the soil has been influenced by deposits of sandy material blown from the adjoining sandy soils. Most of the soil is used for hay land, and the rest is used for farming. The hay land occupies the more poorly drained areas. The principal grasses are big bluestem, Indian grass, and slough grass, and the yield of hay ranges from 1½ to 2 tons to the acre. Owing to the loamy texture of the surface soil, Lamoure loam is easily handled where adequately drained. Corn yields from 25 to 35 bushels to the acre and oats from 20 to 30 bushels.

LAMOURE SILTY CLAY LOAM

Lamoure silty clay loam has a black surface soil and a gray subsoil. The dark surface soil consists of black heavy plastic silty clay loam which grades into grayish-black clay in the transitional zone between the surface soil and subsoil. The upper few inches of the surface soil is filled with a dense growth of grass roots of slough grass, Indian grass, and some salt grass. The soil is hard when dry and breaks into large angular clods. The subsoil is dark-gray silty clay, plastic when wet and rather hard and brittle when dry. The soil is limy throughout. The upper part contains large amounts of humus and organic matter. At a depth of 36 inches a sand and gravel substratum is reached.

Areas of this soil occur between South Platte and North Platte Rivers. The most extensive area extends eastward from O'Fallons to the head of Scout Creek. Natural drainage is poor, but large drainage ditches have improved this condition, and the soil is gradually being placed under cultivation. About 50 per cent of the total area is now under cultivation, mainly to corn, wheat, and sugar beets. Crop yields are about the same as on other Lamoure soils. For successful tillage this soil requires moderate moisture conditions, as it clods badly when plowed wet and the lumps are difficult to reduce. Plowing when dry is almost impossible on account of the hard compact consistence of the soil.

LAMOURE SANDY LOAM

The surface layer of Lamoure sandy loam is loose, incoherent, dark grayish-brown sandy loam containing many roots of salt grass and some of grama grass. The material is calcareous and is not so rich in humus as other members of the Lamoure series. This layer is underlain at a depth of about 4 inches by light-gray calcareous friable sandy loam lighter in color than the surface layer and containing less organic matter than the layer below or above it. The next lower layer, a heavy compact black hardpan which distinguishes this from other

Lamoure soils, occurs about 8 inches below the surface and ranges in thickness from a mere streak to about 8 inches. The material breaks from the soil wall in prismatic blocks from 2 to 4 inches in diameter, and the broken surface has a varnished or glistening appearance. Further breakage of the prismatic pieces produces a sharp angular nutlike mass. These pieces are crushed with difficulty and when reduced to powder form become lighter in color, similar to the broken surfaces of the underlying material. On the ends of the prismatic blocks thin cracks radiating from a local or central axis serve as breakage lines for smaller prismatic blocks. The material in this layer is silty clay or clay which does not effervesce with acid. Intrusions of lighter-colored material, averaging one-fifth inch in diameter, enter this layer from beneath. Below the black hardpan layer is reddish-brown silt loam that effervesces with acid more actively than any other layer of this soil. The material breaks into columnar blocks from 4 to 6 inches in diameter. Below a depth of 34 inches is a layer of bluish-gray or olive-gray clay or heavy silty clay loam, which changes in color to mouse gray at a depth of about 40 inches. At a depth of about 45 inches is the sand and gravel substratum, which is of water-laid origin and is arranged in stratified layers. Numerous rust-brown specks or spots occur within this material.

Areas of Lamoure sandy loam are level or undulating and include poorly drained depressions. During dry periods of summer spots of alkali appear over the surface and the vegetal cover shows the effects of drought. Surface drainage is better than on other members of the Lamoure series. This is probably owing to the fact that this soil lies slightly higher than associated soils.

One extensive area of this soil lies near North Platte. Another area consists of a belt beginning 4 miles west of Maxwell, passing south of the town, and extending southeastward toward Brady. Most of the land is used for pasture, but some of it has been successfully devoted to alfalfa and corn. The grass growth is short and consists principally of salt grass (*Distichlis spicata*) and some grama grass. The grass has a low pasturage and hay value.

LAMOURE VERY FINE SANDY LOAM

The surface soil of Lamoure very fine sandy loam is black friable very fine sandy loam 12 inches deep. It contains a large proportion of silt and an abundance of organic matter which gives the soil its dark color. Beneath this layer is the slightly heavier dark-gray or dark grayish-brown very fine sandy loam subsoil which has the columnar structure common to the Lamoure soils. Between depths of 24 and about 40 inches is a mouse-gray layer which is underlain by the gravel substratum.

The material of the entire soil section is highly calcareous, and in places alkali has accumulated. Insect casts and wormlike intrusions are most abundant in the first two layers.

The largest areas of this soil are along Platte River southeast of Brady Island. Areas are flat and slope gradually toward the river. Drainage is fair, but as the underlying water table is so near the surface the soil remains too moist for the production of most crops. In seasons of heavy rainfall water stands on the surface of the lower-lying areas for a long time. The crops best adapted to this soil are

corn, oats, sweetclover, and sugar beets. Sweetclover grows wild and produces large yields of seed which is harvested and sold at a good price. Sugar beets, which yield well, are more alkali resistant than any other crop grown in Lincoln County.

CASS LOAM

The surface soil of Cass loam is very dark grayish-brown or almost black loam about 6 inches thick, in the upper part of which is a dense mass of grass roots and decayed organic matter. It contains considerable silty material which gives it a velvety feel when wet; it is also slightly calcareous. Directly underlying this layer is the subsoil of gray fine sand stained with rust brown, which within 2 inches gives way to the sand and gravel substratum.

This is the most extensive member of the Cass series mapped in Lincoln County. It comprises most of the first bottoms of Birdwood, Medicine, and Red Willow Creeks. The largest areas are in the Platte River flood plain.

CASS SANDY LOAM

The surface soil of Cass sandy loam is dark grayish-brown loose structureless sandy loam which in many places has a scant scattering of gravel on the surface. It is underlain at a depth ranging from 3 to 8 inches by fine sand stained with rust brown. Below this is the fine sand and gravel substratum.

The color of the surface soil varies somewhat but in most places the content of organic matter is sufficient to make the color dark. Drainage is excessive and the soil is droughty, as is evidenced by the very sparse growth of native grasses.

Cass sandy loam has a small total area in Lincoln County. One important tract occurs as a narrow strip which begins south of Hershey, passes eastward beyond Nichols, and extends over the valley toward Cody Ranch on North Platte River. Another area is at the air-mail station, and one is south of Lamplough Lake. About 50 per cent of the land is under cultivation. Crop growth is not successful, except in places where slightly better moisture conditions prevail. The remainder of the land is used for pasture.

CASS FINE SANDY LOAM

The surface soil of Cass fine sandy loam is dark-brown or dark grayish-brown loose fine sandy loam from 8 to 12 inches thick. It is well supplied with organic matter and is but slightly calcareous. The next lower layer is grayish-brown loamy fine sand that extends to an average depth of 20 inches where it is underlain by the light-gray coarse or medium sand and gravel substratum. Rust-brown stains are noticeable in the upper part of the substratum, but these disappear with depth.

This soil occupies an area of 3.7 square miles in stream bottoms in Lincoln County. It occurs extensively in Dawson County to the east but extends into Lincoln County for only a short distance. Areas are flat or undulating. Drainage, though usually sufficient for the successful growth of crops, is uncertain, because of the nearness of the water table to the surface.

Most of the land is under cultivation, mainly to corn, oats, and some forage crops. The land can be cultivated without injury under a wide range of moisture conditions.

The selling price of land of this kind ranges from \$40 to \$50 an acre.

CASS CLAY LOAM

The surface layer of Cass clay loam is slightly calcareous dark grayish-brown or black friable clay loam 6 inches deep, containing large amounts of humus and a thick mass of grass roots. It is underlain by gray fine sand spotted with rust brown which continues to a depth of about 12 inches where the fine sand and gravel subsoil occurs.

Soil of this kind occurs in small areas along the Platte bottoms. Most of the areas are on the outskirts of the flood plain and have received the finest material of the flood waters. This accounts for the heavy texture of the surface soil.

All the Cass clay loam is used for hay meadow or for pasture land. The hay crop yields from 1½ to 2 tons to the acre.

LAUREL VERY FINE SANDY LOAM

The surface soil of Laurel very fine sandy loam is dark-gray or grayish-brown friable very fine sandy loam 12 inches deep. It is underlain by grayish-brown or grayish-yellow very fine sandy loam containing rust-brown and bluish-gray stains. In most places the substratum of sand and gravel occurs below a depth of 36 inches.

The soil effervesces very freely with acid throughout. It is very low in organic matter.

This soil occurs in a narrow strip south of South Platte River near the Keith County line. It is all used for hay land. The yield of hay ranges from 1 to 1½ tons to the acre.

LAUREL SANDY LOAM

The surface soil of Laurel sandy loam is grayish-brown loose sandy loam. It is underlain at a depth of 6 or 8 inches by friable calcareous fine sandy loam stained with rust brown and gray. At a depth ranging from 24 to 36 inches this grades into gravel and sand. The soil material is calcareous only in the subsoil. The surface soil is free of lime carbonate, owing in part perhaps to the great content of sandy material which allows leaching of the carbonates into the subsoil. This soil is composed of wind-deposited sand, which has been swept out of the dry river channels, and of alluvial deposits.

Laurel sandy loam occurs in a narrow strip bordering South Platte River on the north. It follows the river channel farther than is indicated on the map, but owing to the extreme narrowness of the area it could not be shown on a small-scale map.

On account of the nearness of the water table to the surface, this land is poorly drained during wet seasons. During the haying season the land is usually sufficiently drained to allow the use of harvesting machinery. Most of the soil is uncultivated and is devoted principally to the growing of native hay.

Land of this kind sells for \$40 or \$45 an acre.

SARPY SAND

Sarpy sand consists of a layer of grayish-brown loose incoherent sand 6 inches deep, underlain by lighter-colored material of the same texture and structure to a depth of more than 3 feet. This soil differs from the Cass soils in having a lower content of organic matter and a lighter-colored soil. It is composed largely of recent river alluvium deposited above the river channel by overflow or by wind sweeping the material from the river channel.

This soil occurs in narrow belts bordering the river channel or between small river channels and has formed narrow islands in the valley. Areas range from undulating to slightly hummocky and are similar in many respects to the Valentine soils. Owing to the porosity of the soil, drainage is excessive. The agricultural value is very low.

SCOTT SILT LOAM

The surface soil of Scott silt loam, to an average depth of 8 inches, is black heavy silt loam rich in well-decomposed organic matter and filled with roots of sedges and meadow weeds. The subsoil includes several more or less poorly developed layers. In general, however, it has an upper layer of dark grayish-brown heavy compact clay, reaching a depth of 16 inches, and a lower layer of lighter-colored grayish-brown or olive-gray friable fine sandy loam. These three layers are low in lime, and no carbonates can be detected above a depth of 7 feet, at which depth the less weathered parent material is reached.

Areas of this soil are a typical feature within areas of the Rosebud soils. They occupy small, rounded, sinklike depressions widely distributed over the upland areas and form basins in which the surplus run-off in an area of undeveloped drainage ways collects. The most extensive tracts of this soil are in Jack Morrow Flat, on Garfield Table, and south of Wallace.

Owing to poor drainage the land is of little agricultural value, but as the greater part lies within cultivated areas of other soils it is used for crop production. Crops usually suffer from lack of moisture in dry periods or from too much moisture in wet seasons.

DUNE SAND

Dune sand is the name applied to the soil of a vast area known as the sand hills. It is by far the most extensive soil in Lincoln County, occupying 40.8 per cent of the total area.

Dune sand consists of grayish-yellow or grayish-brown smooth incoherent fine or medium sand which extends to a depth of more than 6 feet with little change in texture. The surface 4 or 5 inches contains some organic matter but not enough to prevent drifting when the grass covering is removed. The material is fairly retentive of moisture notwithstanding its loose consistence. It is noncalcareous.

Dune sand is very uniform throughout Lincoln County. Locally it contains more silt, clay, and organic matter than typical, owing probably to more favorable weathering conditions and to the growth and decay of plant life. The loamier areas have a thicker grass covering than most of the material and therefore a greater grazing value.

Areas of dune sand are sharply rolling, forming a succession of monotonous irregular dunes. In some places, especially along cow paths and around windmills on the large ranches, erosion is active. Owing to the porosity of the soil, drainage is excessive. Drainage ways are not established.

This land is used chiefly as pasture. It is said that after a year of judicious grazing and care in fire prevention the native grasses can establish themselves and furnish good pasturage. About 10 acres a head is required for grazing cattle. The largest ranches in the county are located on dune sand. A large area is south of Garfield Table in Cox precinct.

The average price of land of this kind is between \$4 and \$5 an acre.

RIVER WASH

Small areas of river wash are mapped along Platte River. They are parts of the river channel left when the flood plain was narrowed by the construction of artificial embankments or when the river shifted its course to the farther side of the flood plain, leaving a part of the old channel dry except at flood times. Many patches of river wash were too small to map. This material differs from Sarpy sand in that it is less stable. The more stable areas are covered with a growth of willows, vines, and briers.

SUMMARY

Lincoln County is in southwestern Nebraska. It is part of a level plain, sloping toward the southeast, which has been modified by stream erosion and wind action. The alluvial lands, including the terraces and flood plains, lie in the Platte Valley which crosses the central part of the county.

The average elevation of the county is 2,800 feet above sea level. The general slope is to the south and east.

The census for 1920 shows an urban population of 10,466 and a rural population of 12,954. North Platte is the county seat and principal town.

The climate is favorable for grain and hay production and for the raising of livestock. The average frost-free season is 153 days.

Agriculture consists of the raising of livestock and the production of grain and hay crops. Many large cattle ranches are in the county, particularly in the sand-hill section. The principal crops are corn, oats, wheat, alfalfa, and wild hay. Hogs are raised on every farm capable of producing corn and alfalfa for feed.

The soils of Lincoln County have developed in a climate and under a grass vegetation favorable for the accumulation of much organic matter and lime carbonate. All the mature soils, therefore, have dark-colored surface layers and a zone of lime accumulation in their subsoils. The subsoils of the well-developed soils are cloddy or nut-like in structure. The fully developed soils occur only on the smoothly rolling uplands in the southern part of the county and on the broad well-drained terraces of Platte River. On the steeper slopes and narrow ridge cliffs, erosion has hindered deep soil weathering and the accumulation of organic matter, and a group of immature soils has resulted. Another group of immature soils is found in the sand-hill

section of the county. Poorly drained and consequently slightly developed soils occur in the depressions throughout the uplands and on the river flood plains.

Soils of the Holdrege, Rosebud, Keith, and Hall series are very productive. They are the most fully developed soils in the county.

The Colby, Anselmo, and Bridgeport soils are less highly developed but constitute good grazing and hay land.

The Scott soils occupy poorly drained depressions within areas of the Rosebud soils. They are of very little agricultural value.

The Valentine soils and dune sand are very unstable and are used chiefly for hay and pasture land.

The Cass, Sarpy, Lamoure, and Laurel soils occupy the bottom lands along the streams and are subject to overflow during periods of high water.

River wash is a very unstable material which occurs adjacent to the Platte Rivers. It is nonagricultural.



[PUBLIC RESOLUTION—No. 9]

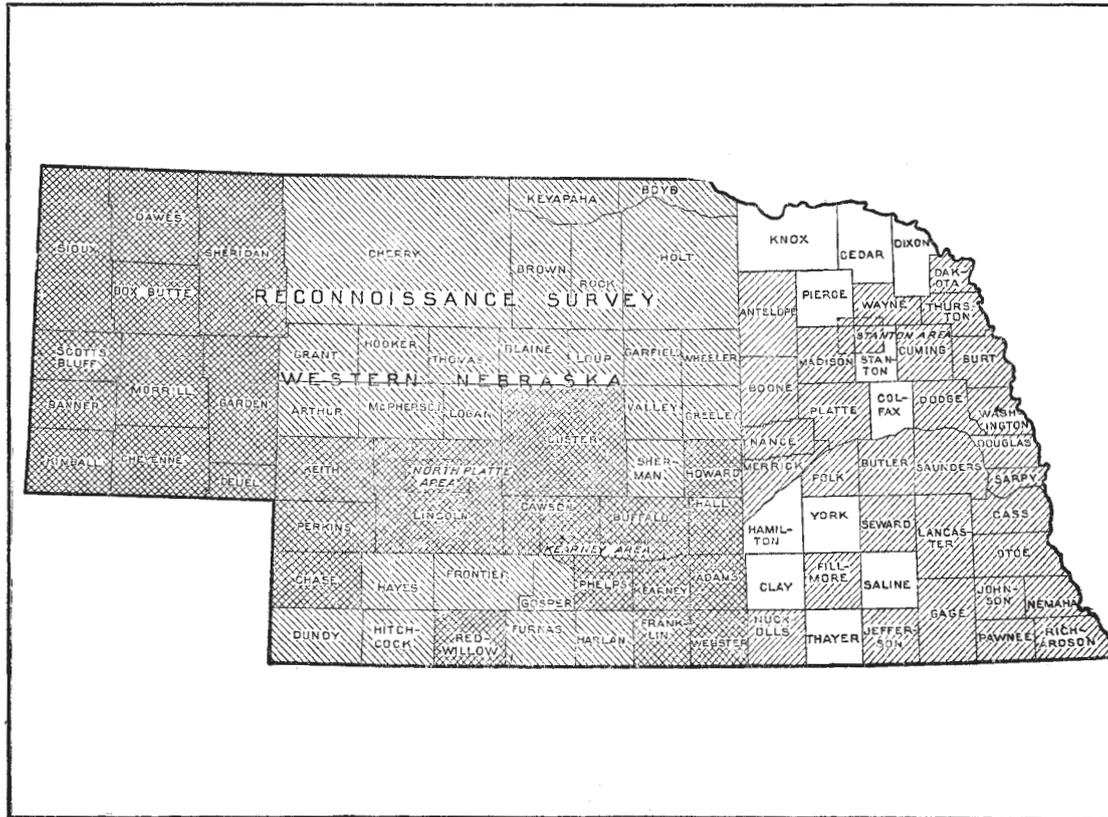
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided,* That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils, and on July 1, 1927, the Bureau of Soils became a unit of the Bureau of Chemistry and Soils.]



Areas surveyed in Nebraska, shown by shading

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To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by:

- (1) mail: U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410;
- (2) fax: (202) 690-7442; or
- (3) email: program.intake@usda.gov.

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