BEFORE THE INDIAN CLAIMS COMMISSION

THE SIOUX NATION OF INDIANS, consisting in part of the SIOUX TRIBE OF THE ROSEBUD INDIAN RESERVATION, SOUTH DAKOTA; THE SIOUX TRIBE OF THE STANDING ROCK INDIAN RESERVATION, NORTH AND SOUTH DAKOTA; THE SIOUX TRIBE OF THE PINE RIDGE INDIAN RESERVATION, SOUTH DAKOTA; THE SIOUX TRIBE OF THE CROW CREEK INDIAN RESERVATION, SOUTH DAKOTA; THE SIOUX TRIBE OF THE LOWER BRULE INDIAN RESERVATION, SOUTH DAKOTA; THE SIOUX TRIBE OF THE CHEYENNE RIVER RESERVATION, SOUTH DAKOTA; THE SIOUX TRIBE OF THE SANTEE INDIAN RESERVATION, NEBRASKA; AND THE SIOUX TRIBE OF THE FORT PECK INDIAN RESERVATION, MONTANA,	)	
Plaintiffs,	)	
v.	)	Docket No. 74-B
THE UNITED STATES OF AMERICA,	)	
Defendant.	)	

Decided: February 15, 1974

FINDINGS OF FACT

The Commission makes the following findings of fact:

1. PARTIES.

The plaintiffs in Docket 74-B--the Sioux Tribe of the Rosebud Reservation, South Dakota; the Sioux Tribe of the Standing Rock Indian Reservation, North and South Dakota; the Sioux Tribe of the Pine Ridge Indian Reservation, South Dakota; the Sioux Tribe of the Crow Creek Indian Reservation, South Dakota; the Sioux Tribe of the Lower Brule Indian

Reservation, South Dakota; the Sioux Tribe of the Cheyenne River Reservation, South Dakota; the Sioux Tribe of the Santee Indian Reservation, Nebraska; and the Sioux Tribe of the Fort Peck Indian Reservation, Montana--are each identifiable groups of American Indians maintaining a tribal organization recognized by the Secretary of the Interior as having authority to maintain this suit under Section 2 of the Indian Claims Commission Act, 25 U.S.C. §70a (1970). The plaintiffs are the successors in interest to the Sioux tribes or bands which signed the Treaty of April 29, 1868, 15 Stat. 635.

2. AREA INVOLVED AND DATE OF TAKING.

The area to be valued is located generally in the western part of the present State of South Dakota. It was carved out of the Great Sioux Reservation[1/] by the Act of February 28, 1877, 19 Stat. 254. The subject tract

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1/ The Great Sioux Reservation was set aside by the Treaty of April 29, 1868, 15 Stat. 635, and was described as follows:

> . . . commencing on the east bank of the Missouri river where the forty-sixth parallel of north latitude crosses the same, thence along low-water mark down said east bank to a point opposite where the northern line of the State of Nebraska strikes the river, thence west across said river, and along the northern line of Nebraska to the one hundred and fourth degree of longitude west from Greenwich, then north on said meridian to a point where the forty-sixth parallel of north latitude intercepts the same, thence due east along said parallel to the place of beginning; and in addition thereto, all existing reservations on the east bank of said river. . . . [Id. at 636.]

contains 7,345,157 acres, and may be defined as follows:

> Beginning at the intersection of the 103rd meridian of west longitude with the northern boundary of the State of Nebraska, then north along the 103rd meridian to the south fork of the Cheyenne River, then down the south fork to its junction with the north fork (Belle Fourche River), then up the north fork of the Cheyenne to the 103rd meridian, then north along the 103rd meridian to the 46th parallel of north latitude, then west along the 46th parallel to the 104th meridian, then south along the 104th meridian to the northern boundary of the State of Nebraska, then east along the northern boundary of Nebraska to the point of beginning.

Royce assigned the cession number 598 to the subject tract.

The date of valuation of the subject area is February 28, 1877.

3. EARLY CONTACT OF AMERICANS WITH THE SUBJECT AREA.

Americans had been aware of the potential value of the subject area long before it was acquired from the Sioux by the United States. There is evidence that mining and trapping parties entered the Black Hills area as early as the 1830's and 1840's. During the early 1850's, prospecting parties enroute to California mined in the Black Hills and recovered gold.

In 1857 Lt. G. K. Warren, a topographical engineer, led a reconnaissance expedition into Sioux country. In the Black Hills area, Lt. Warren discovered gold. In his report he also noted that the area was watered by beautiful flowing streams, and that it contained rich valleys capable of cultivation and ample timber and other building materials.

Another military party, under the command of Brigadier General W. F. Raynolds, surveyed the portion of the subject tract between the 43rd and 45th parallels in 1859 and 1860. In describing the Black Hills, General Raynolds stated:

> . . . The whole region of the Black Hills is unquestionably destined, at no distant date, to afford homes for a thriving population. The mountains will furnish a sufficient supply of pine lumber for ordinary uses; and although timber is very scarce in the region as a whole (from Fort Pierre to the Powder River), yet the Black Hills will fully supply this great deficiency in the districts immediately joining. [Pl. Ex. CB-13: "The Black Hills-Their Value, Regardless of Gold," Potters American Monthly, August 1875, Vol. V, No. 44, p. 618.]

General Raynolds also noted that the valleys in the hills contained rich and fertile soils and were covered with a heavy growth of grass.

During 1865 a military expedition enroute to the Powder River area passed through the northern Black Hills. Many specimens of gold-bearing quartz were discovered. In 1866, Dr. Ferdinand V. Hayden led a scientific expedition into the hills. Dr. Hayden found gold and reported that it could be found in almost every stream.

Beginning in 1867, and continuing through 1872, various individuals and organizations formed parties with the intention of entering into the Black Hills for mining activities. These plans generally were thwarted by the United States Army which at that time was intent on keeping Americans out of the Sioux reservation. In 1873 the territorial legislature of Dakota Territory petitioned Congress to move the Sioux to the eastern portion of the reservation and to open the Black Hills to white settlement.

4. CONTACT OF AMERICANS WITH THE SUBJECT AREA DURING 1874 AND 1875.

In early 1874 the Secretary of Interior established a commission, known as the Special Sioux Commission, to negotiate with the Brule and Ogallala Sioux to abandon their rights under articles XI and XVI of the 1868 treaty, and to confine their activities to the

reservation.[2/] The Commission was only partly successful in its mission, obtaining from the Brules the surrender of their article XI rights only, and obtaining no agreement at all from the Ogallalas.

In May of 1874 the Secretary of War directed Lt. Colonel George A. Custer to command an expedition into the Black Hills to explore the area. Custer, with approximately one thousand men, left Fort Abraham Lincoln, in northern Dakota, on July 2, 1874, circled the northern limits of the Black Hills, and entered them from the west. On this expedition gold was discovered in paying quantities, although the exact extent of the gold field was not known. Reports of the gold find were widely circulated and greatly exaggerated by the press. As a result of these reports, white miners began to invade the Black Hills in great numbers.

During August of 1874 members of the Special Sioux Commission, under the leadership of Samuel D. Hinnan, explored the southern Black Hills in

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2/ In article XI of the 1868 treaty, the Sioux had reserved the right to hunt outside their reservation, north of the North Platte River and along the Republican River so long as the size of the buffalo herd made hunting worthwhile. In article XVI, the United States agreed "that the country north of the North Platte river and east of the summits of the Big Horn mountains" should remain "unceded Indian territory" and closed to white entry. The Commission has determined that under article 16 the Sioux had a right to hunt in the "unceded Indian territory." Sioux Tribe v. United States, Docket 74, 23 Ind. Cl. Comm. 358 (1970).

search of a new agency site. In his report, dated November 10, 1874, Hinman reported that the Black Hills were bleak and barren, that there was little or no mineral wealth, that the water was of poor quality, and that the hills were generally worthless as agricultural land. It is unclear from the record why Hinman's report was so pessimistic, although his confessed sympathy for the Sioux and their right to retain the Black Hills may have prejudiced his objectivity.

The enthusiasm created by the Custer expedition was not dampened by the Hinman report, and great pressures continued to be exerted against the Government to open the Black Hills to white settlement. Great numbers of miners continued to flock to the hills. In 1875 it became apparent to government officials that occupancy of the Black Hills by nonIndians was inevitable, and it was decided to acquire the Black Hills from the Sioux. In order to determine what would be a fair price to the Sioux for the Black Hills, President Grant ordered that a topographical and geological survey be conducted. He appointed Walter P. Jenney, a mining engineer, to head the survey. Jenney was instructed to report on the mineral, timber, and agricultural resources of the Black Hills.

Jenney's preliminary report to the Commissioner of Indian Affairs was dated November 8, 1875. Jenney stated that on entering the hills he had found miners on French Creek, and that after a month's work gold was found in paying quantities on Spring and Rapid Creeks. He further reported that:

> That portion of the Black Hills which may be designated as Harney's Peak goldfield is almost wholly in Dakota, and extends about fifty miles

> north and south, with an average breadth of nearly twenty miles, covering an area of not less than eight hundred square miles. The valuable gold-deposits, however, are found in the valleys of the streams which drain that area, the gold being derived from the disintegration of the quartz-ledges, which are very numerous in the rocks of that region.
>
> The most extensive and valuable deposits of auriferous gravel discovered during the past season were in the valleys of Spring and Rapid Creeks and their tributaries, where, in almost every case, the gravel-bars are very advantageously situated for working, and where many natural circumstances contribute materially to the profitable extracting of the gold which they contain. [1875 Report of the Commissioner of Indian Affairs, p. 181.]

Jenney also reported that there was sufficient timber and rapidly flowing water for successful mining operations.[3/]

In commenting on the nonmineral attributes of the Black Hills, Jenney noted that, although the area of cultivable land was limited, the soil was deep and fertile and would be sufficient to supply the future population of the area. Jenney estimated that at least one-twentieth of the 3000 square miles of the Black Hills was susceptible of cultivation, and that there were many other large areas which would afford fine grazing.[4/]

3/ Jenney was referring to placer mining. The survey expedition did not carry equipment for testing quartz deposits. Moreover, the expedition did not enter the northern part of the Black Hills where the more extensive quartz lodes were later discovered.

4/ In his annual report to the Secretary of the Interior, the Commissioner of Indian Affairs discussed the Jenney report. He stated,

> . . . The report confirms, in a large degree, the statements of travelers and explorers and the reports of General Custer's military expedition of last year, and shows a gold-field with an area of eight hundred square miles, and around this gold region, principally

Throughout the spring and summer of 1875, great numbers of miners moved into the Black Hills. Although the Army succeeded in removing some of these, it was either unable or unwilling to keep the bulk of them out of the Great Sioux Reservation.

5. ACQUISITION OF THE BLACK HILLS.

In May 1875 a delegation of Sioux chiefs and other leaders was brought to Washington to hear proposals concerning the purchase of the Black Hills by the United States and the extinguishment of various off-reservation hunting rights possessed by the Sioux. On June 3, 1875, President Grant met with the delegation. He explained to them that if gold were found in large quantities in the Black Hills it would be difficult to keep white people from going there, and that the Government might not make strong efforts to keep them out.

After the members of the Sioux delegation returned to their agencies, an agreement was reached whereby the Sioux relinquished their remaining hunting rights in Nebraska in return for $25,000 in goods. This agreement

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4/ (cont.)

> to the north, an additional area within the Black Hills country of three thousand square miles of arable lands, and this latter embracing along its streams an area equal to two hundred square miles finely adapted to agriculture, while the hill-sides and elevations contiguous thereto are equally adapted to purposes of grazing, making the whole area of three thousand square miles of timber, grazing, and arable land of great value for agricultural purposes. [1875 Report of the Commissioner of Indian Affairs, p. 8.]

was apparently never ratified or enacted into law by Congress.

In mid June 1875, the Secretary of Interior, acting under instructions from President Grant, appointed a commission to negotiate with the Sioux for the cession of the Black Hills and for the surrender of the Sioux right to hunt in the Big Horn area in Southeastern Montana. This Commission became known as the Allison Commission.

During September 1875 the Allison Commission met with the Sioux in a grand council. It was urged that the Sioux sell the Black Hills because 1 - they were unable to support themselves and ought to bow to the wishes of the Government which fed them, 2 - the Army was unable to keep settlers out of the hills and armed conflict between whites and Indians was inevitable, and 3 - gold was useless to the Sioux. The Sioux, realizing the great value of the Black Hills to the United States, offered to sell them to the United States for 70 million dollars, plus additional compensation for the gold already mined. The Commission, in return, offered to pay $400,000 per year for the right to mine, grow livestock, and cultivate the soil in the Black Hills, or, in the alternative, to buy the hills outright for six million dollars. The Commission further proposed that the United States purchase the Big Horn area for a total of $500,000, paid over a ten year period. The parties were unable to reach agreement as to the terms of the sale. The Allison Commission reported its failure to the Secretary of Interior.

In November 1875, the Grant Administration began to change its policy toward the Black Hills. The President, with the concurrence of his

Secretary of War and Secretary of Interior, decided that, although non-Indians were still forbidden from entering the hills, the army would no longer seek to enforce the law. The Army would be removed from the Black Hills, and no further military opposition was to be offered to miners attempting to enter the hills. No official announcement was made of this policy change.[5/]

The Army began its withdrawal from the Black Hills on November 17, 1875. Thereafter, miners flocked to the hills in ever increasing numbers. By January 1876 more than 4,000 whites were reported to be in the Black Hills.

Also in November 1875, the Grant Administration began to pressure Congress for unilateral action to acquire the hills. In his 1875 annual report, Commissioner of Indian Affairs Edward Smith noted that the Sioux were unable to support themselves and were receiving about one and one-quarter million dollars in rations annually, which the United States was under no legal obligation to provide. He stated that failure to receive these rations would reduce the Sioux to a state of starvation. It was Smith's opinion that the Government was entitled to ask something of the Sioux in return. He recommended that legislation be sought setting a fair equivalent for the Black Hills, and that a portion of that equivalent

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5/ Grant later justified his decision by stating that any further attempt to remove the miners would have resulted in the widespread desertion of the troops.

should be made to take the place of free rations.

The 1875 Annual Report of the Secretary of Interior voiced a similar attitude. The report stated that for the past two years Congress had been appropriating one million two hundred sixty thousand dollars for sustenance of the Sioux; that this amount was a gratuity for which the Government received nothing; and that without receipt of this amount the Sioux would starve. The Secretary concluded that the Government would be justified in making receipt of further rations contingent on Sioux relinquishment of the Black Hills gold fields.

Without waiting for congressional action, the executive branch precipitated the Sioux situation into a crisis. In response to hostilities against whites and Indians of other tribes in the unceded Indian territory by small numbers of nonreservation Sioux, the Secretary of Interior, on December 3, 1875, instructed the Commissioner of Indian Affairs to direct agents at all agencies in Dakota and at Fort Peck to notify the Sioux in the Yellowstone and Powder River areas "that unless they shall remove within the bounds of their reservation (and remain there) before the 31st of January next, they shall be deemed hostile, and treated accordingly by the military force." Pl. Ex. 548: S. Ex. Doc. No. 52, 44th Cong. 1st Sess. 5 (1876).

The bulk of the Sioux who were in the unceded territory during the winter of 1875-76 were hunting with the permission of their agents, as they had the right to do under Article XVI of the 1868 treaty. When they received notice of the order to return to the reservation, they replied

that they would return in the spring after the hunt. The severity of the winter made it impossible for most of the Sioux to comply with the Secretary's order. Nonetheless, on February 1, 1876, the Secretary of the Interior notified the Secretary of War that his order had not been complied with, and that the Sioux were being turned over to the Army for appropriate military action.

The Army commenced hostilities against the Sioux in the spring of 1876. The war was to last for more than a year and was bitterly fought by both sides.

On June 25, 1876, the Seventh Cavalry, under the command of George A. Custer, attempted a surprise attack upon an Indian encampment in the valley of the Little Big Horn River, in what is now Montana. The Sioux inflicted a crushing defeat on the Army, killing 259 men, including Custer.

News of the battle reached Washington on July 5, and fomented great anti-Sioux sentiment. Congress reacted by attaching the following rider to a one million dollar Sioux subsistence provision in the appropriations act enacted August 15, 1876, 19 Stat. 176, 192:

> . . . Provided, That none of said sums appropriated for said Sioux Indians shall be paid to any band thereof while said band is engaged in hostilities against the white people; and hereafter there shall be no appropriation made for the subsistence of said Indians, unless they shall first agree to relinquish all right and claim to any country outside the boundaries of the permanent reservation established by the treaty of eighteen hundred and sixty-eight for said Indians; and also so much of their said permanent reservation as lies west of the one hundred and third meridian of longitude, and shall also grant right of way over said reservation to the country thus ceded for wagon

> or other roads, from convenient and accessible points on the Missouri River, in all not more than three in number; and unless they will receive all such supplies herein provided for, and provide for by said treaty of eighteen hundred and sixty-eight, at such points and places on their said reservation, and in the vicinity of the Missouri River, as the President may designate; and the further sum of twenty thousand dollars is hereby appropriated to be expended under the direction of the President of the United States for the purpose of carrying into effect the foregoing provision:

In short this provision meant that unless the Sioux ceded the Black Hills to the United States, and surrendered their right to hunt off the reservation, the United States would allow them all to starve.

In accordance with the congressional directive the President appointed another commission to negotiate with the Sioux. During the autumn of 1876 the commission met with the Sioux at the various agencies. Despite the ultimatum contained in the appropriations act, less than 10% of the male adult Sioux assented to the cession agreement proposed to them by the commission. Nonetheless, the commission submitted the purported agreement to the President, who in turn submitted it to Congress.

Article XII of the 1868 treaty, which created the Great Sioux Reservation, provided that

> . . . No treaty for the cession of any portion or part of the reservation herein described which may be held in common shall be of any validity or force as against the said Indians, unless executed and signed by at least three fourths of all the adult male Indians, occupying or interested in the same; . . . [15 Stat. 635, 639.]

The 1876 agreement clearly did not comply with this provision. Nevertheless Congress effectuated the terms of the agreement by the Act of February 28, 1877, 19 Stat. 254.

The 1877 Act provided for the removal of the subject tract from the Sioux reservation and the abrogation of all Sioux rights outside of the reservation, and also contained the following provision in Article 2.

> . . . The said Indians also agree and consent that wagon and other roads, not exceeding three in number, may be constructed and maintained, from convenient and accessible points on the Missouri River, through said reservation, to the country lying immediately west thereof, upon such routes as shall be designated by the President of the United States; and they also consent and agree to the free navigation of the Missouri River.

6. ESTABLISHMENT OF CIVILIAN GOVERNMENT WITHIN THE SUBJECT AREA.

The Dakota Territory, as created by the Act of March 2, 1861, 12 Stat. 239, included an area stretching from the western boundary of Minnesota to the main range of the Rocky Mountains. The Territory was divided into three judicial districts, and the first election was held in the fall of 1861 for the purpose of selecting a delegate to Congress and members of the territorial legislature. Yankton was designated the territorial capital, and the legislature met there beginning on March 17, 1862. Over the next six years, the size of Dakota Territory sharply decreased as a result of the creation of the Idaho, Montana and Wyoming Territories, so that on the valuation date the territory consisted of the present states of North and South Dakota.

Although the Black Hills area remained legally a part of the Great Sioux Reservation until February 28, 1877, and thus outside the territorial limits and jurisdiction of the Dakota Territory, 6/ miners, settlers and other persons in increasing numbers started to occupy the Hills during 1875, and the total white population reached an estimated 15,000 to 20,000 by the end of 1876. Pennington, Lawrence and Custer Counties within the Black Hills were created in January 1875 by the territorial legislature in anticipation of subsequent formal organization. Moreover, well before the extinguishment of Sioux title, the miners and other trespassers on Sioux land took steps to safeguard their own claims to ownership.

When General Crook in July 1875 ordered the occupants of Custer City to leave the Black Hills, for example, the miners established a townsite, made a new survey of the town plat, and held a drawing for the right to town lots. In addition, a committee was selected to remain in the country with the consent of General Crook to protect improvements and other property until the area became legally open. During 1876, townsites for the Black Hills communities of Rapid City, Deadwood, Hill City, Lead City, Spearfish, Crook City, Sheridan, Castleton and Harney all were laid out and platted. Similarly, in order to protect their claims, the miners set up mining districts, such as the Lost Mining District in December of 1875, Whitewood Mining District in February of 1876, and Ida Gray Quartz Mining District

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6/ The Act of March 2, 1861, supra, specifically excluded land on Indian reservations from Dakota Territory.

on July 10, 1876.

Thus, when Sioux title to the Black Hills finally was extinguished by the Act of February 28, 1877, supra, the area was ready for formal political organization and large-scale economic development. Lawrence and Pennington Counties were formally organized on March 5, 1877, and Custer County on April 3, 1877. The jurisdiction of the courts attached and, with both safety of title assured and a governmental machinery for enforcing legal rights established, the hills became attractive to capitalists and investors, already aware of the demonstrated presence of gold, as well as to permanent settlers.

7. TOPOGRAPHY.

The subject tract is composed of two distinct topographic areas -- the Black Hills, and the surrounding plains. The Black Hills are a series of mountains ranging in elevation from 4,000 to more than 7,000 feet. The slopes are steep and hilly and are surrounded by a rolling plateau.

There are four major topographic divisions of the Black Hills. In the center is a core area known as the Crystalline Basin. It is surrounded by a plateau-like region known as the Limestone Plateau. Farther out from the center is the Red Valley which is surrounded by a ring of high ground known as the Great Hogback Ridge. The foothills range from 2,700 to 5,000 feet and slope to the plains surrounding the hills.

Outside the Black Hills the subject tract is typical Great Plains. The land north of the hills is a rolling plateau with gentle valleys eroded through the basic elevation and with a sprinkling of buttes. The area

between the forks of the Cheyenne River is a plain inclined to the east through which the Black Hills drain. There are also plains to the south of the hills. Elevations range upward from about 2,000 feet with the lowest points to the east.

8. CLIMATE AND WATER SUPPLY.

The subject tract has a four season temperate climate with hot summers and cold winters. The mean annual temperature averages about 45° F. The average annual precipitation ranges from eleven to eighteen inches on the plains, and from 16 to 30 inches in the Black Hills. In the winter this precipitation falls mainly as snow, with mountain communities like Deadwood and Lead receiving as much as 90 inches of snowfall in a season. The average growing season varies--in the plains from 120 to 140 days, in the hills from 100 to 120 days.

The subject tract in general is adequately watered. The Cheyenne, Belle Fourche, North and South Forks of Moreau, South Fork of Grand, and Little Missouri Rivers traverse the subject tract, as do many lesser streams and creeks. However, there are some areas on the plains where water supplies are intermittent, and where storage dams or wells have had to be constructed to provide adequate water for year-round stock raising.

The contemporary accounts portrayed the Black Hills as having an excellent water supply. Colonel Richard B. Dodge and Walter P. Jenney in their accounts of their 1875 expedition described the Black Hills water as profuse and excellent in quality. In a more detailed report of his

expedition, published by the Interior Department in 1876, Jenney stated that the water within the Black Hills was generally pure and abundant. However, according to Jenney the water became less plentiful as one moved away from the core of the hills, and in the foothills some of the water contained excessive chemicals.

9. SOIL AND GROUND COVER

The central areas of the Black Hills contain predominantly gray wooded soils. These soils developed under a humid climate, from vegetation consisting mainly of pine and spruce, and with parent materials which include limestone, sandstone, and alluvium from igneous and metamorphic rock. This gray wooded soil occurs in the central core area and on the Limestone Plateau. The mountainous areas and the Hogback consist mostly of rock outcrop with some lithosols. The Red Valley contains predominantly Chestnut soils.

The plains area contains the following soil types: Bainville, Morton, Pierre and Promise--all Chestnut soils--Flasher and Lismas--both Regosols--and Rhodes--a Solonetz. The soils are well to excessively drained and have a generally brown loamy surface.

The contemporary accounts generally praised the soils of the subject tract. For example, in 1858 Warren reported that the Black Hills had many small rich valleys covered with fine grass and susceptible of cultivation by irrigation. He predicted that the area would provide the means of raising sufficient quantities of grains and vegetables to support its future population. In his 1876 report, Jenney described the soil in

many portions of the hills to be excellent and capable of cultivation. He stated that other areas in the hills would provide excellent grazing. Jenney estimated that 1/20 of the Black Hills area of 6,000 square miles was susceptible of cultivation. Also writing in 1876, Dodge made the following evaluation of the soils of the Black Hills:

> The soil of the granitic area is a rich black loam, admirably adapted to agricultural purposes. This is true of almost every portion of valley or hill or mountain, on which there is any soil whatever. The glades in the forest, the park openings, the creek bottoms, the hill sides, are all covered with a thick carpet of splendid grass, such as is only grown on the richest soil. The soil on the tops of the mesas is somewhat lighter in color, but apparently equally good, the result, in grass and other luxuriant vegetation, being equally fine.
>
> The Red Valley varies greatly in the quality of the soil of various localities. In some places it is filled with alkali to such an extent as to kill off all vegetation, except cactus and a scanty growth of thin grass; in other, and the greatly larger portions, it is covered with a rank growth of the very finest "gama" or "buffalo" grass.
>
> The vicinity of Inyan Kara, in spite of the alkaline streams and red clay soil, is second, as a grazing ground, to no place in the Hills. Here, too, we found the creek bottoms filled with hops, as fine as I ever saw cultivated. Plums, gooseberries, and some few other wild fruits grow in great profusion.
>
> As we get away from the vicinity of the Hills, the soil gradually deteriorates, until, near the south Cheyenne, or Belle Fourche, we find the ordinary soil of the plains.
>
> There appears no reason why the Black Hills should not be a most magnificent agricultural country. Some portions will undoubtedly be so; in other portions, the season may prove too short for certain agricultural products. [Def. Ex. M-1: R. Dodge, The Black Hills 55-56 (reprinted 1965).]

In her book, published after the valuation date, Annie Tallent stated

that between the mountain ranges of the Black Hills there were rich fertile valleys covered with a luxuriant growth of grass and susceptible of a high degree of cultivation. She added that the soils of the valleys surrounding the hills were also exceedingly productive in cereals and all vegetables suitable to the latitude, receiving inexhaustable fertilization from the minerals in the hills.

The dominant types of grasses in the subject tract are 1 - true prairie grasses, including June, Spear and Wheat grass, 2 - short grasses, including Buffalo and Grama. Dwarf sedge occurs in the early spring, while wire and Fesque grasses appear locally, as do bunch grasses and Big Blue Stem. In the foothills and the Red Valley Big Blue Stem, Indian Hair, Sand Grass, Tall and Blue Grama grasses grow. In the mountain meadows Timothy grows as well as some Drop Seed and Spear Grass. South of the Cheyenne River Blue and Tall Grama, as well as Buffalo and Wire Grass, grow.

Colonel Dodge referred to the grasslands in his 1876 book. He stated,

> However it may turn out as a farming country, there can be no doubt of its immense value as a grazing country. Splendid grass, pure water, excellent shelter from storms--nothing is wanting to fill all the requirements of a first-class stock-farm. It will, before many years, furnish beef and mutton, butter, cheese, and wool for a nation.
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> The country is not adapted for stock ranches of immense herds, water being so plentiful that they would stray, and the thickets being too dense for proper supervision of them. For farmers who own a few head of fine blooded stock, I think the Black Hills will be the Vermont of the West.

> These remarks refer to the Hills proper. The Red Valley and the outlying plains country offer immense advantages to the large stock-owner. Hundreds of thousands of cattle and sheep can be subsisted and wintered on the foot-hills and contiguous plains. [Dodge, supra, at 56-57.]

The grasslands today have deteriorated from their condition prior to the valuation date, primarily because they have been overgrazed.

10. TRANSPORTATION FACILITIES.

By the summer of 1874, the subject tract was surrounded by white settlement on all sides. The Union Pacific-Central Pacific Railroad passed to the south of the tract. The two closest stops were at Sidney, Nebraska, 120 miles from the subject area, and at Cheyenne, Wyoming, 140 miles from the area. The Northern Pacific Railroad terminated at Bismarck which was about 120 miles northeast of the tract. There was also steamboat traffic on the Missouri River. Therefore, facilities existed for Americans to get to within comparatively short distances from the Black Hills gold fields.

A variety of stagecoach routes entered the subject area on or before the date of valuation. These lines ran from Sidney, Nebraska, to Deadwood; from Cheyenne, Wyoming, to Deadwood; from Bismarck, Dakota, to Deadwood, and from Southeastern Dakota to Deadwood. All of the stagecoaches traveled over roads which before the taking date were in Indian territory. Therefore, the stagecoach rider faced the constant danger of Indian attack, as well as the risk of holdup by bandits.

11. PLAINTIFFS' GENERAL APPRAISER.

Mr. Donald D. Myers appeared before the Commission as expert witness and

general appraiser for the plaintiffs. Mr. Myers is a well qualified land appraiser, and a member of the American Institute of Real Estate Appraisers. He has testified as an expert witness in court on numerous occasions including four other cases before the Indian Claims Commission.

Mr. Myers divided the subject tract into several highest and best use areas. He assigned 1,500 acres to townsites, 24,000 acres to minerals, 200,000 acres to agriculture, 750,000 acres to timber, and the remaining 6,369,657 acres to grazing. Mr. Myers' appraisal report concludes that on the valuation date the townsite land had a value of $820,000, that the agricultural land had a value of $1,000,000, that the timber land had a value of $1,875,000, and that the grazing land had a value of $7,960,000. Mr. Myers also adopted the conclusion of Mr. Roy Full, plaintiffs' mineral appraiser, that the mineral lands had a value of $13,558,489, and concluded that the entire tract had a fair market value of $25,213,489. Mr. Myers also valued the improvements on the land on February 28, 1877, at $625,000.

12. DEFENDANT'S GENERAL APPRAISER.

Mr. Harry R. Fenton appeared before the Commission as expert witness and general appraiser for the defendant. Mr. Fenton is a well qualified land appraiser, and a past president of the American Institute of Real Estate Appraisers. He has previously testified before the Commission as an expert witness several times.

Mr. Fenton appraised the subject tract as a single area and concluded that its surface value on the valuation date was

$2,570,805. He also adopted the conclusion of Mr. Ernest Oberbillig, defendant's mineral appraiser, that the mineral value of the tract was $2,123,000, and concluded that the entire tract had a fair market value on February 28, 1877, of $4,693,805, which he rounded off to $4,700,000.

13. HIGHEST AND BEST USE.

On the valuation date, February 28, 1877, the subject tract contained the following highest and best use areas:

Townsites	1,000	acres
Agricultural land	200,000	acres
Timber land	750,000	acres
Grazing land	6,378,157	acres
Mineral land	16,000	acres
TOTAL	7,345,157	acres

14. TOWNSITES.

During 1876, at least nine townsites were laid out and platted within the subject tract. The largest of the towns within the subject area on the valuation date was Deadwood (including adjacent Elizabeth City) in Lawrence County, with a nonIndian population of 4000 to 5000. Other major communities in the Black Hills were Central City (including adjacent Anchor City, Gayville, and South Bend) in Lawrence County, with a population of 1500 to 2000; Lead City in Lawrence County, with a population of about 1000; Crook City in Lawrence County, with a population of about 300; Galena in Lawrence County, with a population of 300 to 400; Rapid City in Pennington County, with a population

of about 300; and Custer City in Custer County with a population of about 250.[7/] Other towns in the subject area on the valuation date were Hayward in Custer County, Montana City, Spearfish, and Sturgis in Lawrence County, and Sheridan in Pennington County.

At the valuation date most of the Black Hills settlements were experiencing a period of economic boom. Deadwood, for example, had been organized in April 1876 and laid out on twenty-two lots. Shortly thereafter it was reported to be laid out along Deadwood Gulch for a distance of one mile with every lot occupied. Its population, estimated at two thousand in June of 1876, leaped to between 6,000 and 10,000 by the summer of 1877.

In July of 1877, five months after the value date, Deadwood was reported to contain buildings and improvements worth over one million dollars. There were reported to be over 1500 buildings on the ground. Deadwood had three daily and three weekly newspapers, over two hundred shops and mercantile houses, three banks, thirty hotels and eating places, over seventy saloons and gambling houses, two theaters, several large halls, two churches, a bathhouse, a good waterworks, and a fire department. The Elizabeth City (or Elizabethtown) portion of Deadwood was devoted to manufacturers and small tradesmen.

The record contains evidence of sales of townlots within Deadwood during the years 1876 and 1877. There were 52 transactions, involving 68 townlots, in which the deed did not indicate that the property being sold contained improvements. The total consideration involved

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7/ During the spring and summer of 1876 the population of Custer reached as high as 2,000. The gold rush to Lawrence County in late 1876 virtually depopulated Custer City.

in these sales was about $25,000, with individual prices ranging from $3 to $3,000 per lot.

The Commission finds that on February 28, 1877, the subject tract contained 1000 acres with a highest and best use for townsites.

15. PLAINTIFFS' APPRAISAL OF TOWNSITES.

Mr. Myers, plaintiffs' appraiser, assigned values to five of the Black Hills townsites. These were Deadwood (including Elizabethtown), which he estimated contained 4,000 people on the valuation date; Central City (including Anchor City, Gayville, and South Bend), which he estimated contained 1,000 people; Lead City, which he estimated contained 1,000 people; Rapid City, which he estimated contained 250 people; and Custer City, which he estimated contained 250 people.

Mr. Myers' township valuation centered chiefly on the Deadwood townsite. Mr. Myers was unable to find a plat of the Deadwood townsite. He was therefore forced to estimate, based upon contemporary accounts of the size of Deadwood, that the core business area covered 125 acres. He further estimated that the entire townsite contained 250 acres, with 200 acres being townlots and the remainder being devoted to streets and other commonground. Mr. Myers concluded that on February 28, 1877, Deadwood would have contained 1,750 lots of 50 feet by 100 feet, or 3,500 lots of 25 feet by 100 feet. He chose the latter figure as the number of townlots in Deadwood because prior to the valuation date most of the original 50 foot lots had been subdivided into 25 foot lots.

Mr. Myers and his associates examined the deed records of Lawrence County for 1876 and 1877. Deeds for 73 sales of townlots within

Deadwood were found. The sale prices indicated on the deeds ranged from 3 dollars to 5000 dollars per lot. The total consideration for the 73 sales was $49,430, or about $677 per transaction. Eighteen of the deeds indicated that there were improvements included in the sale. These sales totaled $22,324.50, or an average of about $1240 per transaction. The remaining 55 sales totaled $27,105.50, or an average of about $495 per transaction. Mr. Myers assumed that these sales involved unimproved land. Mr. Myers excluded from his calculations the eighteen sales which indicated improvements.

Mr. Myers proceeded to organize the sales data according to the Deadwood street upon which the sold lot was located. His results are indicated in the following table, with the last two columns being rounded figures:

Street	Number of Sales on Street	Number of Lots Involved	Total Consideration	Average Indicated Lot Value
Boughton and Beary Road	1	2	$ 165	$ 85
Deadwood	3	3	495	165
Water	2	3	525	175
Sherman	10	12	4,035	335
Williams	5	6	2,960	495
Lee	4	4	2,103	525
Main	18	18	13,842	770
Miscellaneous and Unnamed	12	23	4,230	185

[Pl. Ex. CB-1: Appraisal report of Donald D. Myers, p. 34.]

Mr. Myers determined the average sale price per lot on each street. He then assumed that each of the seven Deadwood streets contained 250 lots in the central core area of the city. Multiplying the average sale price per lot by 250 resulted in the street values shown in the following table:

Street	Average Indicated Lot Value	Number of Lots	Indicated Street Value
Boughton and Beary Road	$ 85	250	$ 21,250
Deadwood	165	250	41,250
Water	175	250	43,750
Sherman	335	250	83,750
Williams	495	250	123,750
Lee	525	250	131,250
Main	770	250	192,500
Total Indicated Core Area Value			$637,500

[Id.]

Mr. Myers concluded that the sales data indicated a value for the central core area of Deadwood of $637,500. He estimated that the remainder of the townsite would have had a much lower value.

Mr. Myers then used another approach. He assumed that the city of Deadwood contained three general types of real estate: 1 - the prime commercial land in the core area; 2 - the secondary commercial land outside the core; and 3 - the residential perimeter. He then assumed that the 3500 lots in the township had a total value approximately equivalent to the value for the core area he had obtained by the lot-street method described above. Mr. Myers broke down the total value in the three land types and reached the following result:

Core Area Lots	750 at $350	$262,500
Secondary Commercial Lots	1,250 at $175	218,750
Perimeter Residential Lots	1,500 at $100	150,000
SUMMATION		$631,250

[Id.]

Mr. Myers completed his Deadwood valuation by stating that a prospective purchaser would pay a lesser amount than the sum of the individual lot values, and would expect a substantial speculative profit margin on his investment. Mr. Myers concluded that the fair market value of Deadwood on February 28, 1877, was $600,000.

Mr. Myers indicated that he could find no deed records for the other four townships he was valuing. However, he stated that the value of a township derives from its population, and that he could estimate the relative values of towns by comparing their populations. He noted that Deadwood, with an estimated value of $600,000, and an estimated population of four thousand, had a value of $150 per capita. He estimated that Central City and Lead, both containing smaller populations and experiencing less booming economies, would have had per capita values two-thirds that of Deadwood. He further estimated that the per capita values of Rapid City and Custer City would have been one-quarter that of Deadwood. He thus assigned values of $100,000 each to Central City and Lead City, and $10,000 each to Rapid City and Custer City.

Mr. Myers' valuation of the townsites in the subject tract can be summarized as follows:

Deadwood	$600,000
Central City	100,000
Lead City	100,000
Rapid City	10,000
Custer City	10,000
Total Townsite Value	$820,000

16. DEFENDANT'S APPRAISAL OF TOWNSITES.

Mr. Fenton, defendant's appraiser, in the letter of April 28, 1969, transmitting his valuation report to the Department of Justice, stated,

> . . . This appraisal is based on the premise that the United States was purchasing from the Sioux only the virgin lands. This valuation does not include consideration of the additional values which were created by the miners and other settlers in the Black Hills prior to the date of cession. [Def. Ex. F-115, transmitting letter.]

In accordance with this premise Mr. Fenton did not appraise any of the Black Hills townsites, and included no value for townsites in his valuation conclusion.

In its proposed finding of fact 11, defendant states its position to be "that the townsite lands did not justify a separate use value but were adjuncts to the mining operations, and, as such, merely provided a plus value for the tract as a whole."

17. VALUE OF TOWNSITES.

Based on all the evidence in the record, and the preceding findings, the Commission finds that on February 28, 1877, the fair market value of the townsites within the subject area was $250,000.

18. AGRICULTURAL LAND.

The agricultural potential of the Black Hills was clear prior to February 28, 1877, and had been noted by contemporary observors such as Warren in 1857, Custer in 1874, Jenney in 1875 and 1876, William P. Dewey,

Surveyor General of the United States, in 1875, and Dodge in 1876. Agricultural development before the valuation date remained minimal, however, because farmers were particularly vulnerable to Indian attacks, and because farm equipment was not yet readily available in the subject tract. These impediments were removed with the extinguishment of Indian title, and after February 28, 1877, there was a continuous expansion of agricultural activity. In 1878 preemption and homestead filings totalled 1803 acres. By 1882, 65,673 acres had been filed upon; and by 1883, in excess of 100,000 acres had been filed upon.

Some of the agricultural land in the tract needed irrigation to be properly farmed. Initially the development of irrigation was retarded by rugged terrain, high cost, and the antipathy of farmers who had access to a generally adequate water supply. Irrigation did begin in western Lawrence County along Spearfish and Spring Creeks in 1877, with the completion of fifteen ditches by 1879. Irrigation was also begun in the Rapid City area with the intention of opening an additional 96,000 acres to farming.

Contemporary estimates of the amount of farmland within the subject tract vary. Jenney in 1875 estimated that not less than 1/20 of the 3,000 square miles of the Black Hills was susceptible of cultivation. This would be equivalent to 96,000 acres. In his 1876 report Jenney repeated the 1/20 estimate but used it in the context of a total Black Hills area of 6,000 square miles. This would be an equivalent of

192,000 acres. Jenney reported that the most fertile lands were along the valleys of such streems and rivers as the Belle Fourche River, Rapid Creek, Red Water Creek, Spearfish Creek, and others.

The Cheyenne Daily Leader, in August 1876, reported that the Spearfish Valley had sufficient fertile land to support five hundred farms of 160 acres each, or an equivalent of 80,000 acres. In 1878 the Chicago Inter Ocean stated that the valley of Rapid Creek contained irrigable farmland two miles wide and 45 miles long, which is equivalent to 57,600 acres. Andreas' Historical Atlas of Dakota, published in 1884, estimated that there were 300,000 acres of good farmland in the valleys of Rapid, Spring, Box Elder, and Battle Creeks. The 1890 federal census classified 500,000 acres in the subject tract as being farmland.

The Commission finds that at the valuation date, high quality farmland was located in the valleys of the following rivers or streams: Battle Creek, Beaver Creek, Belle Fourche River, Box Elder Creek, French Creek, Cheyenne River, Rapid Creek, Red Cannon Creek, Red Water Creek, Spearfish Creek, and Spring Creek. The subject tract contained 200,000 acres of excellent agricultural land.

19. SALES OF AGRICULTURAL LAND.

The nearest sales of farmland to the subject tract around the valuation date occurred in the three southeastern Dakota counties Clay, Union, and Yankton. The record contains evidence of 209 of these sales in the years 1875, 1876, and 1877. These 209 sales involved a total of 31,567 acres. The total consideration involved in these sales was

approximately $150,000, and the average price was about $4.80 per acre. The parcels involved in the sales ranged from 5 acres to 560 acres; considerations ranged from 50 to 3,000 dollars per sale; and per acre prices ranged from $0.31 to $50.00. The record does not indicate whether the lands involved in these sales were improved or unimproved.

The record also contains data on sales of sections 16 and 36 school lands by several midwestern states prior and subsequent to the valuation date. In Minnesota, between 1862 and 1877, a total of 579,833 acres of school lands were sold at an average price of $6.03 per acre. In Nebraska, prior to January 1, 1877, 110,362 acres of state land had been sold at an average price of $9.26 per acre. By 1888, the total sales of Nebraska state lands was 725,591 acres at a total price of $5,741,034, or an average of $7.91 per acre. In Kansas, between 1865 and June of 1878, 215,216 acres of school land sold for a total of $911,489, or an average price of $4.24 per acre. Between July of 1878 and July of 1880 an additional 117,557 acres of state land sold for $448,010, bringing the Kansas land sales to a total of 332,773 acres at a price of $1,359,499, or an average of $4.09 per acre.

Sales of railroad grant lands are also indicated in the record. Total sales of several railroads as of the date indicated are shown in the following table:

Railroad	Date	Acres	Total Consideration	Average Price Per Acre
Union Pacific (Main Line)	Dec. 31, 1879	1,568,438.62	$7,432,534.98	$ 4.73
Kansas Division (formerly Kansas Pacific)	June 30, 1880	1,433,953.32	4,266,589.32	2.98
Denver Division (formerly Denver Pacific)	June 20, 1880	164,604.78	732,067.71	4.45
Central Branch Union Pacific	Mar. 31, 1877	70,287.53	327,425.41	4.66
Central Pacific (including Oregon Branch and Western Pacific)	June 30, 1880	726,534.54	4,324,888.70	5.95
Northern Pacific	June 30, 1880	2,593,983.18	9,089,453.99	3.50
Atlantic and Pacific	Dec. 31, 1879	220,259.20	623,369.04	2.86
Atchison, Topeka and Santa Fe	June 30, 1880	993,675.79	5,802,985.98	5.84

These railroad sales total 7,771,736.96 acres at a price of $32,599,315.13, or an average of $4.19 per acre.

20. PLAINTIFFS' APPRAISAL OF AGRICULTURAL LAND.

Mr. Myers, plaintiffs' surface appraiser, used two methods to arrive at his estimate of the number of acres of farmland within the subject tract. Initially he examined the contemporary references and determined that the valleys of the major rivers and streams were the areas containing the principal agricultural land. Then he calculated the number of acres in

these valleys, assuming that the land for one-half mile on each side of the river was cultivable, i.e. an equivalent of 320 acres per mile on each side of the river. He then discounted by 20 percent to allow for any land which might not be farmable. His results are shown in the following table, with column 2 representing the length of the stream within the subject tract, column 3 representing the number of acres per mile, column 4 representing the total farm acres along the stream, and column 5 representing a 20 percent discount of this acreage:

(1) River or Creek	(2) Miles	(3) Acres	(4) Acres	(5) Acres
Battle Creek	34	640	21,760	17,408
Beaver Creek	14	640	8,960	7,168
Belle Fourche	30	320	9,600	7,680
	58	640	37,120	29,696
Box Elder Creek	40	640	25,600	20,480
Cheyenne River (South Fork)	104	320	33,280	26,624
French Creek	30	640	19,200	15,360
Rapid Creek	32	640	20,480	16,384
Red Canyon Creek	34	640	21,760	17,408
Red Water Creek	12	640	7,680	6,144
Spearfish Creek	20	640	12,800	10,240
Spring Creek	58	640	37,120	29,696
Totals			255,360	204,288

[Pl. Ex. CB-1, p. 42.]

Mr. Myers concluded that there were 200,000 acres of excellent farmland within the tract.

As a second method Mr. Myers examined census data for 1870 for the other major mining regions in the country--Colorado, Montana, and Nevada. He determined that Colorado contained 8.0 acres of farmland per person, Montana contained 6.8 acres of farmland per person, and Nevada contained 4.9 acres of farmland per person. Applying these figures to a projected population of thirty thousand for the subject tract, Mr. Myers concluded that at least 200,000 acres of farmland would be needed within the tract.

In his farmland evaluation Mr. Myers placed greatest weight upon land sales data from Clay, Union, and Yankton Counties in southeastern Dakota. The deed records for these counties for the period 1875 through 1877 were examined, and 209 sales were chosen as proper for analysis. The lands involved in these sales sold at an average price of $4.80 per acre.

Mr. Myers eliminated thirteen sales of over $12.50 per acre as probably involving improved land, and five sales of less than $1.25 per acre as probably not being valid arms-length market transactions. The average price of the lands in the remaining sales was $4.34 per acre.

Mr. Myers then broke down the entire 209 sales into sales price groupings of three dollars each. He then created a table in which he indicated the number of sales within each price group, the midpoint per acre price of each group, and the total acreage within each group. 8/

8/ See generally, Pl. Ex. CB-1, p. 45, table 17.

From this table Mr. Myers ascertained a mean price of $5.69 per acre, a median price of $4.62 per acre, a mode price of $4.50 per acre, and a weighted average price of $5.05 per acre. Mr. Myers also analyzed the sales data county by county, in each instance creating a table based upon sales price groupings of three dollars.

In his evaluation Mr. Myers also relied upon state school land sales in Minnesota, Nebraska, and Kansas, and upon sales of railroad grant lands.

In comparing all the sales land with the agricultural land in the subject tract, Mr. Myers noted that the sales lands would have had an advantage over the subject lands because of proximity to a railroad or to a larger population concentration, but that the subject lands had the advantage of being the selected best of the agricultural lands in the tract, and of constituting a monopoly of the farmland within the general area. Mr. Myers concluded that the value of the 200,000 acres of farmland within the subject tract was within a range of four dollars to nine dollars per acre, and he chose five dollars per acre, or a total value of $1,000,000, as his final value figure.

21. DEFENDANT'S APPRAISAL OF AGRICULTURAL LAND.

Mr. Fenton, defendant's appraiser, stated the following with regard to agricultural land:

> The minor amount of agricultural land found on the subject tract was not significant in the valuation. Any ranch and, certainly, the lands used as comparable sales would have its share of meadow and tillable soil, but in a sale of the whole this part would not be extracted and given a separate value in the minds of the parties. [Def. Ex. F-115: Appraisal Report of Harry R. Fenton, p. 40.]

Accordingly, in his appraisal of the subject tract, Mr. Fenton added no value for agricultural lands.

22. VALUE OF AGRICULTURAL LAND.

Based on all the evidence in the record, and the preceding findings, the Commission finds that on February 28, 1877, the fair market value of the 200,000 acres within the tract with a highest and best use as agricultural land was $700,000.

23. TIMBERLAND.

The most abundant and economically important tree in the subject area was the Ponderosa or Western Yellow Pine. Some Spruce and Douglas Fir could also be found, as well as several species of hardwood.

Dr. F. V. Hayden, who explored the subject area in 1859 and 1860, reported that two thousand square miles (1,280,000 acres) were covered with excellent pine timber. Henry S. Graves, in an 1899 report for the U. S. Geological Survey, estimated that the Black Hills Forest Reserve contained 1,311,936 acres of timberland. Approximately 1,100,000 of these acres are within the subject tract. A 1935 study of G. A. Pearson and R. E. March reported 1,053,997 acres of forest land within the tract, of which 482,223 acres had been "cut-over." Most recently, in 1960, the U. S. Forest Service classified 1,311,000 acres within the subject tract as commercial timberland, with 708,000 acres consisting of sawtimber stands.

The 708,000 acres classified by the Forest Service as sawtimber are estimated to contain 2,886,038,000 board feet of timber, or an average of

4,076 board feet per acre. In 1899, Graves estimated that the Black Hills forests averaged about 4,000 board feet per acre.

The Commission finds that on February 28, 1877, the subject tract contained 750,000 acres of timberland. This land averaged 4,000 board feet per acre.

24. DEMAND FOR TIMBER.

Although Black Hills timber was inferior in quality to timber growing in the Great Lakes region or along the Pacific coast, it was the only commercially useful timber available for hundreds of miles in each direction. Shipment of timber into the subject tract was impractical at the valuation date. Therefore, Black Hills timber possessed an absolute monopoly in the local lumber market.

Because of ongoing mining, commercial and other activites, a substantial market for timber existed in the subject tract on the valuation date. As early as July 1876, the three sawmills in and adjacent to Deadwood were unable to satisfy the demand despite production of nearly 30,000 board feet of lumber and 16,000 shingles each day. By 1877 the demand was so great that 16 sawmills were operating in the Deadwood area alone. Mills also operated near the other Black Hills communities.

Timber--or lumber-- was the basic construction material in the development of the Black Hills, and was of crucial importance to the mining industry. Timber was used for mine supports and shafts; lumber was used for sluice boxes and flumes; hewn timber was used for railroad ties, trestles and bridges; and cordwood was the universal fuel. Lumber was used in the

construction of thousands of buildings. The forests also became the source of building materials and fencing for the farmers and ranchers of the subject tract. A steady demand for wood existed in the tract on and after February 28, 1877, which, until the construction of railroads into the area, could only be satisfied from the local forests.

25. TIMBERLAND MARKET DATA.

Sales of timberland within the subject tract, either before or after the valuation date, did not take place because the miners and settlers freely cut and removed timber from the public domain without making payment to the United States. However, the record does contain evidence of sales and other indications of timberland values.

In its annual report to its stockholders for 1874, the Central Pacific Railroad reported that it had sold its timberlands at an average price of $2.93 per acre. In its annual report for 1874, the Southern Pacific Railroad stated that it set a minimum price of $5.00 per acre in selling its oak timberland, and $10.00 per acre for first class pine timberland. The timber on these railroad lands was of higher quality then that of the subject area.

In 1874 a special commission charged with determining an equitable price for Minnesota timberland received testimony that those lands were worth between four and ten dollars per acre. Minnesota timber was of considerably better quality than Black Hills timber.

26. PRICE OF LUMBER; TOTAL TIMBER CUT.

Near the valuation date, ordinary fuel was selling at $1.50 per cord in the forest, or $4.75 per cord delivered at the mine. The Homestake

Mining Company reported that during the period January 1, 1878, through September 1, 1880, it paid $25.00 per thousand board feet for boards delivered at the mine, 12 to 18 dollars per thousand board feet for mining timbers delivered at the mine, and $7.00 per thousand board feet for saw logs with delivery at the mill. On April 7, 1877, the Black Hills Daily Times, published in Deadwood, reported the following prices for wood products:

Common boards per thousand feet	$45.00
Joist and Scantling	$45.00
Flooring, dressed	$60.00
Siding, dressed	$50.00

With the increase in the number of sawmills, the price of common lumber in Deadwood dropped to twenty-eight to thirty dollars per thousand board feet later in 1877.

Between 1876 and 1897, one and one-half billion board feet of timber was cut in the Black Hills, or an average of 71.5 million board feet per year.

27. PLAINTIFFS' APPRAISAL OF TIMBERLANDS.

Plaintiff's appraiser Mr. Myers relied upon two appraisal methods in valuing the timberlands. First he used a future income method, and secondly a comparable sales approach.

Based on contemporary accounts and the most recent U. S. Forest Service report, Mr. Myers estimated that there were 750,000 acres of commercial timberland in the subject tract on the valuation date.

Mr. Myers then used a complicated series of calculations to arrive at an estimate of the anticipated demand for wood products during 1877 and the following ten years. Initially, he estimated that the nonIndian population of the subject tract was 12,500, and assumed for the purposes of his calculations that this entire nonIndian population entered the tract on, not before, February 28, 1877. Then relying on the 1890 federal census, Mr. Myers estimated that the population of the subject area would increase by 1,600 per year.

Looking at 1870 census data for Dakota Territory, and 1890 census data for the subject area, Mr. Myers estimated that one dwelling would be required for every 4.5 persons residing in the area. There would therefore be a need for about 2,775 dwellings on the taking date, and an additional 355 dwellings per year. He further assumed that the construction of a dwelling required 3,600 board feet of lumber. Therefore, Mr. Myers estimated that housing for the subject tract would create a demand for 9,990,000 board feet of lumber on the taking date, and an additional demand for 1,278,000 board feet per year thereafter.

Mr. Myers used similar type calculations to estimate the wood required for the construction of other buildings within the townsites, such as shops, banks, hotels and saloons. He concluded that the total construction of towns, including dwelling units, would require about 16 million board feet of lumber on the taking date, and an additional 2,055,000 board feet per year thereafter.

Mr. Myers also estimated the amount of wood products that would be needed by the mining industry from 1877 through 1897. Based upon reports of the Homestake Mining Company of its costs for firewood and its ore production, he calculated that one cord of firewood could process 14 tons of ore. Then relying on production estimates of Mr. Roy Full, plaintiffs' mineral appraiser, Mr. Myers estimated that there would be a mining demand for 445,000 cords of fuel wood over the eleven year period.

Relying upon similar reports of the Homestake Mining Company for their timber and lumber costs, Mr. Myers calculated that one thousand board feet of timber would be required for the production of each 40 tons of ore, and that one thousand board feet of lumber would be required for the production of each 696 tons of ore. Again relying upon Mr. Full's production estimates, Mr. Myers estimated that over the period 1877 through 1887 the mines would require a total of 155,750,000 board feet of timber and 8,940,000 board feet of lumber.

Combining his figures for mining and townsite use, Mr. Myers total estimate for the demand for wood products for the period 1877 through 1887 was 423,740,000 board feet.

Based on his estimate for wood consumption, and contemporary evidence of the prices for wood products, Mr. Myers further estimated that the income for a commercial timber operation over the period 1877 through 1887 would be $5,196,000 or an average of approximately $475,000 per year. Relying on evidence of the costs a timber producer might incur in cutting and marketing

wood products, Mr. Myers estimated that net income would be about 20% of gross, or about $95,000 per year. He capitalized this income at a rate of 8% per year to arrive at a figure of $1,187,500. Finally he added 20% of the initial income for structures needed on the taking date, and arrived at a forest value estimate of $1,270,000, or about $1.70 per acre.

Mr. Myers then examined the evidence of timberland sales and other indicators of value in the record. Modifying his income analysis results by the conclusions he drew from examining the market data, Mr. Myers reached a final conclusion that 750,000 acres of timberland had a February 28, 1877, fair market value of $1,875,000, or an average of $2.50 per acre.

In their proposed finding of fact 13 and brief, the plaintiffs, apparently applying a stumpage price of one dollar per thousand board feet, assert that the 750,000 acres of timberland had a fair market value of $3,000,000, or an average of 4 dollars per acre.

28. DEFENDANT'S APPRAISAL OF TIMBERLAND.

Defendant's appraiser Mr. Fenton stated the following with regard to the timber value of the subject area:

> . . . Timber in 1877, found on the subject property in significant amounts only in the Black Hills, was a thing of value once it had been cut and sawed either into lumber and timbers or into firewood. But on the stump it was there for the taking. No evidence has been found of any sales of stumpage in or around 1877. It is my conclusion that the value of the timber was absorbed in the value of the mine or of the land on which it grew. [Def. Ex. F-115, p. 39.]

Accordingly, in his appraisal of the subject area, Mr. Fenton added no

value for timberland.

29. VALUE OF TIMBERLAND.

Based on all the evidence in the record, and the preceding findings, the Commission finds that on February 28, 1877, the fair market value of the 750,000 acres within the tract with a highest and best use as timberland was $1,350,000.

30. GRAZING LAND.

Prior to the valuation date, there were many published reports of the quality of the grazing land in the subject tract. Warren in 1857, Custer in 1874, and Jenney in 1875, all noted that the Black Hills grasslands were excellent.

The earliest primitive ranching in the tract was done by the Sioux who drove herds of buffalo into the Black Hills to graze. Cattle were first introduced into the hills in the early 1870's by Nicholas and Antonine Janis, whose ranch in the vicinity of Custer City eventually had a herd of 2500 head. Some of the earliest ranches in the subject area were stocked with cattle and oxen used by early miners to transport goods and themselves to the Black Hills gold fields. By the end of 1876 several ranches were operating in the tract, supplying meat to the miners and settlers.

After the extinguishment of Indian title in the subject tract, many ranchers began to move cattle into the area. By 1878 there were reported to be 100,000 head between the forks of the Cheyenne River (i.e. between the Belle Fourche and the Cheyenne). Although the 1880 census reported

only 14,295 head of cattle in Custer, Lawrence, Mandan, and Pennington Counties, the "Gordon Report," which was included in the census, stated that on July 1, 1880, there were 40,000 cattle and 20,000 sheep in the Black Hills, and that new herds and flocks were being driven in in great numbers. In 1882 the Black Hills and Live Stock Associations reported sixty ranches or cattle companies in the tract with a total of 264,200 head. The report estimated that this figure represented only about 75% of the total cattle in the area.

The Commission finds that on February 28, 1877, the subject tract contained 6,378,157 acres with a highest and best use for grazing purposes.

31. DEMAND FOR GRAZING LAND.

In the years prior to the date of valuation, western ranchers and cattle companies did not own vast tracts of grazing land. Two governmental policies brought about this result. First was the free grazing policy under which cattlemen were free to drive their cattle onto the Public Domain to graze. Second were the public land laws which permitted acquisition from the Government of small tracts only.

By the middle and late 1870's, however, it had become clear to cattlemen that exclusive control of large areas of rangeland was necessary to the successful operation of a cattle business. Without the legal right to exclusive use of the land the cattleman could not assure that he had sufficient year round feed for his herd; he ran the risk of his water sources being homesteaded and fenced off by settlers; he could not control the breeding of his cattle; he could not protect his herd from losses due

to disease or straying; and he faced the danger of range warfare with other ranchers or with settlers. Ownership of large tracts of land also permitted a larger scale operation which, in turn, resulted in substantially greater profits.

Therefore, at the date of valuation there was a developing demand for large blocks of grazing lands.

32. EFFECT OF DAKOTA WINTERS ON STOCKRAISING.

In reporting on his 1874 exploration of the Black Hills, Custer expressed his belief that cattle could winter in the valleys within the hills without food or shelter other than that which they could obtain running at large. In 1875, Dodge predicted that hundreds of thousands of cattle and sheep could be wintered on the foothills and contiguous plains. Jenny reported that cattle could be wintered easily in the Black Hills, although he also noted that the severe winters would kill cattle in great numbers on the open plains. The 1880 Gordon Report stated that, although the Dakota winters were quite cold, the constant dry winds swept away the snow; the wooded foothills and ravines provided adequate shelter; and the Black Hills grasses provided sufficient winter feed.

H. M. Maguire, writing in 1877, stated that the winters in the Black Hills were such that large herds of cattle could not be supported on the natural grass alone. Supplemental winter feedings would be necessary in order for most cattle to survive until the spring.

The winters of 1878-1879 and 1879-1880 were relatively mild, and the herds wintered well in the Black Hills without

supplemental food or shelter. The winter of 1880-1881 was severe and cattle losses ranged from 8% to 10%. Losses were substantially less during the 1881-1882 and 1882-1883 winters. During the 1883-1884 winter temperatures were extremely low and large amounts of snow fell. Cattle without supplemental feed or shelter died by the thousands; several entire herds were wiped out. The winter of 1886-1887 was the most disastrous for cattlemen. The bitter cold and heavy snows killed thousands of head of cattle. Individual herd losses ranged from 10% to 90% depending on where the herd was wintered.9/

A prudent cattleman in the subject tract would have considered it necessary to provide winter feed and shelter for his cattle. Herds adequately fed and sheltered could endure the most severe winters without experiencing substantial losses.

33. CARRYING CAPACITY.

The record contains no contemporary reports of the cattle carrying capacity of the grazing lands within the subject tract on February 28, 1877. However, it is possible to arrive at the valuation date carrying capacity from an analysis of current data. The Soil Conservation Service (S.C.S.) United States Department of Agriculture, has classified South Dakota lands, including the subject tract, into various vegetation zones. The S.C.S. has subdivided each zone into smaller units called Range Sites, and for each Range Site has projected a natural potential to reproduce native

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9/ In each of the severe winters, cattle which had been moved onto the subject tract late the previous summer or in the fall sustained the heaviest losses. Those cattle which had been in Dakota the previous winter, or were driven in in the spring or early summer, usually stored sufficient fat to survive.

plants, and corresponding recommended stocking rate under climax conditions.[10/] Based on the S.C.S. recommended stocking rates, the 7,345,157 acres of the subject area would have a capacity of 263,216 head, or 22.93 head per section. The 6,379,157 acres of the tract with a highest and best use as grazing land would have a carrying capacity of 228,553 head.

At the valuation date, certain limited portions of the grazing land of the tract had inadequate or bad quality water. Other areas were barren of grass or were otherwise unfit for grazing.[11/] Furthermore, even with supplemental feed and shelter, herds in the subject tract would sustain some loss in severe winters.

Based on the foregoing facts, it is found that on February 28, 1877, the cattle carrying capacity of the 6,378,157 acres of grazing land in the subject area was 145,000 head.

34. PUBLIC LAND COMMISSION STUDY.

Pursuant to the Act of March 3, 1879, 20 Stat. 377, 394, a commission

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10/ A plant community found on a range site in the absence of abnormal disturbance and significant physical site deterioration is the climax plant community for that site. It is the native plant community best adapted to the particular environmental complex of the site. As compared to other plant communities that may temporarily occupy the site, it is relatively stable and in dynamic equilibrium with the environment. The normal disturbances of nature such as drought, fire, and grazing by native fauna, are inherent factors in the development of this community. Its occurrence, therefore, is not always best typified by areas that have been artificially protected from such natural phenomena for extended periods of time. [Pl. Ex. CB-132: United States Department of Agriculture, Soil Conservation Service, National Handbook for Range and Related Grazing Lands §2.42.]

11/ Jenny estimated that six hundred square miles or 1/10 of the Black Hills area was destitute of grass or was an area where grass only appeared in isolated patches.

was established to investigate the conditions of the public land and to recommend legislation. The commission solicited the opinion of western stock raisers concerning problems of the western ranges. Many of the cattlemen expressed the view that the Government should sell or give large tracts of the public domain to the ranchers. Of those that suggested that the land be sold, the majority suggested prices in a range of from eight to twenty-five cents per acre.

35. GRAZING LAND MARKET DATA.

(a) Sales of Railroad Grant Lands. Pursuant to the Act of July 27, 1866, 14 Stat. 292, the United States granted to the Atlantic and Pacific Railroad Company a right of way one hundred feet wide on either side of the proposed railroad, and title to the alternate sections of nonmineral land for forty miles on each side of the line. These lands were located in Arizona. The A.& P. began to sell its lands in 1884. The record contains evidence of seven sales of substantial tracts of A. & P. land, which is summarized in the following table:

Date	Parties	Amount	Acreage
4-21-1884	A & P to Stephen G. Little	$ 75,748	75,748
12-27-1884	A & P to Aztec Land & Cattle Company	529,280	1,058,560
6-6-1885	A & P to Arizona Cattle Company	120,000	120,000
1-12-1886	A & P to E. B. Perrin	22,500	30,000
4-16-1886	A & P to E. B. Perrin	123,600	176,700
7-1-1887	A & P to E. B. Perrin	20,834	29,120 (net after trade)
1-10-1890	A & P to E. B. Perrin	17,280	23,040

[Pl. Ex. CB-1, p. 104.]

The second sale above, that to the Aztec Land and Cattle Company, was made under distressed conditions and for a low price because the railroad was badly in need of money. All of the lands sold were in checkerboard patterns. The total carrying capacity of 1,513,168 acres involved in these sales was 21,543 head.

The Union Pacific Railroad also obtained substantial land grants from Congress. The record contains evidence of several sales of large tracts by the Union Pacific. In 1884 the railroad sold seven tracts of land in Wyoming containing 186,796 acres for a total price of $229,087. The total carrying capacity of these tracts was 4,649 head.

Also in 1884, the Union Pacific sold three large tracts in Wyoming totalling 555,890 acres to the Swan Cattle Company for a total consideration of $460,990, or approximately $0.83 per acre. The record does not indicate the cattle carrying capacity of these tracts.

(b) Sales of Ranchland and Spanish Land Grants. In 1870 the Maxwell Land Grant and Railroad Company acquired 1,679,764 acres of the Maxwell Grant in northern New Mexico and southern Colorado, most of which was grazing land, for a consideration of $1,350,000. The carrying capacity of the Maxwell Grant was 10.2 head per section, or a total of 26,771 head for the entire tract.

In 1868 the Nolan Grant, in Pueblo County Colorado, which was later confirmed at 48,695 acres was sold by the Nolan heirs to Annie Blare for $10,000. At that time the extent of the grant was in doubt. In March 1872 the grant was conveyed to William P. Mellon, trustee, for

$130,000, or about $2.71 per acre. In April 1872 Mellon resold the grant to the Central Colorado Improvement Company for $152,000, or approximately $3.12 per acre. The record does not indicate the carrying capacity of the Nolan Grant.

In 1883 the Hot Creek Ranch in Wyoming, Dakota, and Nebraska--partly in the subject tract--consisting of 409,600 acres, was purchased by the Dakota Stock and Grazing Company, a British Corporation, for .117,000 or $567,450. The record contains no carrying capacity figures for the Hot Creek Ranch.

In 1884 two tracts in northern Texas totalling 210,821 acres were conveyed by D. T. Beals to Andy Whitten and Joseph H. Sparks, trustees for the Pastoral Land Co., a British company, for a consideration of 60,000, or $289,200. The record contains no evidence of the carrying capacity of these tracts.

36. PLAINTIFFS' APPRAISAL OF GRAZING LAND.

Mr. Myers, plaintiffs' appraiser, used two methods in valuing the grazing lands. First he used a future income method based upon a hypothetical cattle business operating in the subject tract, and second, he used a comparable sales approach.

Deducting the acreages he had allotted to townsites, agriculture, timber, and mineral uses, Mr. Myers based his grazing appraisal on the assumption of 6,369,657 acres of grazing land.

Using the Soil Conservation Service recommended stocking rates for the range sites within the subject tract, Mr. Myers calculated that the carrying capacity of the tract averaged 22.93 head per section. This was an equivalent of 228,119 head for the grazing lands of the tract. Mr. Myers then discounted this figure by 25% to provide a safety margin for the hazards of the range and for unequal water distribution. He concluded that on a sustained yield basis the subject tract could support 170,000 head.

Mr. Myers then estimated the annual weight gain, or beef turnoff, to be expected from the 170,000 cattle in the tract. Based on contemporary and more recent data, he assumed that the average steer on the tract would gain three hundred pounds per grazing year. The entire herd, therefore, could produce fifty-one million pounds of beef per year. This is an equivalent of fifty-one thousand steers of one thousand pounds each, which was Mr. Myers estimate for the tract's annual beef turnoff.

Mr. Myers then examined the beef market to ascertain whether there was a sufficient demand for the cattle raised within the subject tract. Examining statistics of beef exports for the years 1870 through 1884, he estimated a foreign demand for 250,000 to 300,000 head per year in and after 1877. Based upon the population of the United States, and contemporary estimates of beef consumption per capita, Mr. Myers calculated a domestic beef demand for 6 to 6-1/2 million head per year in and after 1877. He also estimated that the Government would demand 30,000 to 35,000 head per year to feed the Indians. He concluded that there would be an

annual beef demand for not less than six million head, and that the subject area production would supply less than one percent of this amount.

Mr. Myers next calculated the cost of transporting cattle from the subject tract to Chicago, the closest major meat market. From contemporary data he established that the rail shipping costs from either Sidney, Nebraska, or Bismarck, Dakota, to Chicago averaged about five dollars per head. He further estimated that the railroad expenses incident to shipping the cattle would be about $1.75 per head. He then estimated it would cost about fifty cents per head to drive the cattle from the tract to either Bismarck or Sidney. The total cost of shipment projected by Mr. Myers from the subject tract to Chicago was $7.75 per head.

Mr. Myers examined the evidence of market prices for cattle both on the range and at Chicago for the years 1877. He ascertained that in 1877 the Chicago prices for beef ranged from a low of $3.80 per hundred pounds for medium to a high of $5.50 per hundred pounds for choice. He then estimated an average Chicago price for a one thousand pound steer to be about forty five dollars. Deducting shipping costs and a discount for the possible depressing effect of a large herd, Mr. Myers concluded that a thousand pound steer on the subject tract in 1877 had a value of $32.50.

Mr. Myers next examined contemporary evidence of the yearly costs of raising cattle. He estimated that the normal operating expenses of the ranch would average three dollars per head. He also estimated that supplemental winter feeding and shelter for the herd would cost an

average of two dollars per head.

From contemporary accounts Mr. Myers ascertained that an average herd would sustain about five percent loss per year from disease, theft, drought, and cold. He also estimated that the average steer would lose about 7.5% of its body weight in transport from the subject area to Chicago.

Mr. Myers then applied all his data to calculate the net annual income, attributable to the land, which a hypothetical cattle business in the subject tract would realize in 1877 and the following years. His results are indicated in the following table:

Capacity Of The Tract	170,000 Head
Gross Turnoff Of Beef (170,000 x 300 Pounds)	51,000,000 Pounds
Less: Annual Loss (51,000,000 x 5%)	2,550,000 Pounds
Net Turnoff From The Range	48,450,000 Pounds
Less: Weight Loss During Shipment (48,450,000 x 7.5%)	3,633,750 Pounds
Net Turnoff At Market	44,816,250 Pounds
Converted to 1,000 Pound Steers	44,816 Pounds
Value On The Range (44,816 Head x $32.50)	$1,456,520
Less: Cost of Production 170,000 Head x $3.00 = $510,000	
170,000 Head x $2.00 = 340,000	850,000
NET RETURN TO LAND	$ 606,520

[Pl. Ex. CB-1, p. 98.]

Finally, Mr. Myers examined the record to ascertain the prevailing interest rates at the time of the valuation date. He concluded that

an investor in a continuously operating sustained yield cattle business would expect an eight percent return on his investment. Applying this rate to his calculation of annual income, Mr. Myers concluded that the fair market value of the grazing land of the tract, based on the future income method, was $7,500,000, or $1.17 to $1.18 per acre.

In his comparative sales analysis, Mr. Myers relied upon the Atlantic and Pacific Railroad sales of large tracts in the years 1884 through 1890, and upon Union Pacific Railroad sales in 1884. He compared the sale lands with the subject tract according to their carrying capacities.

From S.C.S. figures Mr. Myers ascertained that the carrying capacity of the A & P sales lands was 28,724 head. As he had in the case of the subject tract, Mr. Myers discounted this figure by 25% to 21,543. Dividing the total sale price of $909,242 by the carrying capacity Mr. Myers established that the A & P lands sold at a rate of $42.20 per head of grazing capacity. He then calculated that if the grazing land of the subject tract were also to sell at $42.20 per head its value would be $7,174,000, or an average of $1.12 per acre.

Using the same method, Mr. Myers calculated that the Union Pacific lands sold at a rate of $49.27 per head of grazing capacity. Sold at this rate, the subject tract grazing land would be worth $8,375,900, or an average of $1.31 per acre.

Combining the values he had obtained by the two methods, Mr. Myers estimated a final fair market value for the grazing land of the subject area of $7,960,000, or about $1.25 per acre.

In their findings of fact the plaintiffs adopted the future income analysis of Mr. Myers and arrived at a fair market value of $7,580,000, or $1.19 per acre. In adopting the comparable sales method of Mr. Myers, plaintiffs also applied it to the 1870 Maxwell Land Grant sale. They calculated that the Maxwell Grant sold at a rate of $50.42 per head of capacity, and that at this rate the subject tract would have been worth $8,571,400, or about $1.35 per acre. Plaintiffs also adopted Mr. Myers' final value figure of $7,960,000.

37. DEFENDANT'S APPRAISAL OF GRAZING LAND.

Mr. Fenton, defendant's appraiser, valued the entire 7,345,157 surface acres of the subject tract as a single unit. He relied exclusively on the market data approach to valuation.

Mr. Fenton's appraisal report is based upon his analysis of the subject tract and of 96 comparable sales. The sales in Mr. Fenton's report are grouped in seven categories: 1. Sales between governments; 2. Governement sales to private parties; 3. Sales of Indian lands; 4. Spanish Land Grant sales; 5. Sales to foreign buyers; 6. Sales between private parties; and 7. Sales of western railroad lands. Mr. Fenton analyzes each group of sales separately.

The first group (sales 1 through 8) contains eight intergovernmental sales. Included in the group are the Louisiana Purchase of 1803, the Florida Purchase of 1819, the Treaty of Guadalupe-Hidalgo of 1848, cessions of land by Texas to the United States in 1849 and 1850, the Gadsden Purchase of 1853, and the purchase of Alaska in 1867.

The acreages of the sales range from about 19 million acres to over 500 million acres. Prices paid ranged from 2 cents per acre to about 53 cents per acre. In comparing these sales to the subject tract, Mr. Fenton considered the political factors involved, the remoteness in date and location, and the relative sizes of the tracts. He concluded that these sales would indicate a subject area value of about 35 cents per acre.

The second group (sales 9 through 21) contains 13 sales by governments to private parties. The earliest sale was in 1834; the latest was in 1883. Acreages ranged from small individual tracts to a tract of three million acres. Prices ranged from about 2-1/2 cents per acre to 2 dollars per acre. The mean price of the sales indicated by Mr. Fenton was about 80 cents per acre. In this group of sales, as in the fourth and sixth groups, Mr. Fenton excluded from his calculations those sales with a per acre price of one dollar or more per acre, on the assumption "that logically the value of the subject property was below a dollar per acre." Def. Ex. F-115, p. 31. The mean price of the nine sales below one dollar per acre was about 34 cents per acre. Comparing these sales with the subject area, Mr. Fenton concluded that they would indicate a subject area value of about 30 cents per acre.

The third group (sales 22 through 26) contains six sales of Indian lands to either the United States or private parties between 1864 and 1890. Acreages ranged from small tracts to a tract of over 30 million acres. Prices ranged from 40 cents per acre to 2 dollars per acre. Mr. Fenton indicated that the mean price of these sales was $1.35 per acre.

Comparing these sales to the subject tract, Mr. Fenton concluded that they indicated a subject tract value of about 40 cents per acre.

The fourth group (sales 27 through 47) contains 21 sales of Spanish Land Grants in New Mexico and Colorado between private parties. These sales took place between 1866 and 1883. The acreages involved in these sales, as indicated by Mr. Fenton, ranged from about forty thousand acres to two million acres. Prices ranged between two cents per acre and $4.11 per acre. The mean price of all the sales was $1.20 per acre. The mean price of the sales at a price less than one dollar per acre was about 38 cents per acre. Comparing these sales with the subject area, Mr. Fenton concluded that they indicated a subject area value of about 30 cents per acre.

The fifth group (sales 48 through 51) contains four sales to foreign investment companies in 1882, 1883, and 1884. Acreages ranged from four hundred thousand acres to almost six million acres. Prices ranged from about sixteen cents per acre to about $1.40 per acre. Comparing these sales to the subject tract, Mr. Fenton concluded that they indicated a subject tract value of about thirty cents per acre.

The sixth group (sales 52 through 69) contains eighteen land sales between private parties. These sales took place between 1867 and 1901. The acreages involved ranged from small tracts to over five million acres. Prices ranged between twelve cents per acre and seven dollars per acre. Mr. Fenton indicated that the mean price of all the sales was $1.92 per acre. The mean price of the seven sales under one dollar

per acre was about forty-five cents per acre. Comparing these sales to the subject area, Mr. Fenton concluded that they indicated a subject area value of about thirty-five cents per acre.

The seventh group (sales 70 through 96) contains compilations of grant lands disposed of by western railroads between 1857 and 1889. The acreages involved in these sales ranged from small tracts to over five hundred thousand acres. Prices ranged from forty-nine cents per acre to $5.84 per acre. The mean price of these sales indicated by Mr. Fenton was $3.37 per acre. Comparing these sales to the subject tract, Mr. Fenton concluded that the value of the subject tract was about one-tenth of this mean, or about thirty-five cents per acre.

Mr. Fenton then analyzed individually several sales which he considered particularly comparable to the subject tract. These were sales by Texas to the United States for twenty, sixteen, and thirteen cents per acre (sales 4, 5 and 6); a sale by Texas of three million acres for fifty cents per acre (sale 16); ranch sales of one million acres for about fifty cents per acre (sale 51), and of over five million acres for about fifty-three cents per acre (sale 60); railroad sales of large tracts for about fifty cents per acre (sales 94, 95 and 96); ranch sales of 73,000 acres (sale 18) and 170,000 acres (sale 21) for fifty cents per acre and twenty cents per acre respectively; an Indian land cession of thirty million acres for forty cents per acre (sale 25); sales of the Maxwell Grant (sales 29 and 31); and the sale of the Seventy-One Quarter Circle Ranch of 2,560,000 acres for about sixteen cents per acre (sale 48.)

Mr. Fenton's final conclusion was that the fair market value of the surface acreage of the subject tract on February 28, 1877, was about $2,570,805, or thirty-five cents per acre.

In its proposed findings of fact defendant relied upon only a few of Mr. Fenton's comparable sales. These were the sale of Seventy-One Quarter Circle Ranch described above (sale 48), the sale of approximately six million acres by Frank Swan to the Swan Land and Cattle Company for forty cents per acre (sale 49) and sales by the Swan Company of 584,143 acres for about eighteen cents per acre (sale 66). Defendant also relied upon the Commission's findings in Crow Tribe v. United States, Docket 54, 6 Ind. Cl. Comm. 98 (1958), in which it gave weight to two 1884 sales by the Union Pacific Railroad to the Swan Company for an average of fifty cents per acre. Defendant did adopt Mr. Fenton's conclusion that the surface acreage of the subject tract was worth thirty-five cents per acre on the date of valuation.

38. VALUE OF GRAZING LANDS.

Based upon all the evidence in the record, and the preceding findings, the Commission finds that on February 28, 1877, the fair market value of the 6,378,157 acres within the tract with a highest and best use as grazing land was $6,600,000.

39. VALUE OF NONMINERAL LANDS.

Based upon all the evidence in the record, and all the preceding findings, the Commission finds that on February 28, 1877, the fair market value of all the nonmineral lands in the subject tract was $8,900,000.

40. MINERAL AREA.

The mineral area in the subject tract was the area of country in South Dakota lying between the Belle Fouche and Cheyenne Rivers. This area was located in present Lawrence, Pennington, and Custer Counties, South Dakota. The total area of the lands having a highest and best use for mineral purposes on Febraury 28, 1877, was 16,000 acres.

41. GEOLOGY AND MINERALS.

The Black Hills Uplift is an irregular dome shaped anticline embracing an oval area approximately 125 miles long and 50 miles wide in the region of western South Dakota and eastern Wyoming. The uplift occurred in a wide expanse of nearly horizontal sedimentary beds, raising a mass of Algonkian schists, conglomerates, quartzites, limestones, granites, and associated rocks 2,000 to 3,000 feet above the surrounding plains. This central core of Precambrian rocks is surrounded by an almost complete sequence of sedimentary formations dating from early Cambrian to late Cretaceous in age.

The lode gold deposits in the Black Hills vary widely in age, mineral content, and physical characteristics, and have accounted for approximately two-thirds of the total mineral production from the region. The majority of this production has been obtained from intensely folded Precambrian rocks along what is now referred to as the Homestake Belt in central Lawrence County, South Dakota. Other lode gold deposits in Lawrence County occur in the basal conglomerate of the Deadwood formation, in flat lying dolomite and quartzite beds, in fissure veins in

limestone, along limestone porphyry contacts, and in intrusive Tertiary porphyries. The Pennington County deposits are found in quartz fissure veins and along zones of fissuring accompanied by shearing, as well as in the intensely folded Precambrian rock. In Custer County the lode gold occurs almost exclusively in quartz fissure veins.

Silver-lead ore deposits have been mined in a complex sulphide ore in Custer County, in the Precambrian schists, slates, and quartzites of Pennington County, and in Cambrian sediments in Lawrence County. None of the silver-lead deposits has proven to be extensive, however, and the major silver production has been obtained as a secondary product of lode gold mining.

Placer gold deposits occur throughout the Black Hills region, having been derived from the weathering and erosion of lode deposits. The value of the placers is dependent upon the value and extent of the source deposits and the availability of sufficient water for economic exploitation.

Other minerals found in the Black Hills region are tin, tungsten, copper, iron, gypsum, mica, lithium minerals, feldspar, caesium, bentonite, limestone and coal.

42. PLAINTIFFS' MINERAL APPRAISER.

Mr. Roy P. Full appeared before the Commission as expert witness and mineral appraiser for the plaintiffs. Mr. Full is a well qualified mining engineer and consulting geologist, with wide experience in mineral valuations before this Commission, the Court of Claims, and other federal and state courts.

Mr. Full valued the lode and placer gold in Lawrence, Pennington and Custer Counties, and concluded that the fair market value of the mineral lands in the subject tract on the valuation date was $13,558,489. Mr. Full also concluded that the gross value of the minerals removed from the subject tract prior to the valuation date was $2,250,000.

43. DEFENDANT'S MINERAL APPRAISER.

Mr. Ernest Oberbillig appeared before the Commission as expert witness and mineral appraiser for the defendant. Mr. Oberbillig is a well qualified metallurgical and mining engineer, with 35 years experience in the appraising of, and consultation on, mining properties. He has appeared as mineral expert in many cases before this Commission and before various courts.

Mr. Oberbillig valued the lode and placer gold in Lawrence, Pennington, and Custer Counties, the silver deposits in Lawrence County, and the mica in Custer County, and concluded that the fair market value of the mineral lands in the subject tract on the date of valuation was $2,123,000. Mr. Oberbillig also accepted Mr. Fulls conclusion that the gross value of the minerals removed from the tract prior to the date of valuation was $2,250,000.

44. EARLY MINING ACTIVITY.

Prior to extinguishment of Indian title in 1877, the primary emphasis in the subject tract was upon placer mining. A minimum amount of equipment was needed to mine most of the placer claims. By the end of 1875 most of the important placers had been discovered. The placer gold rush

reached its peak in the spring of 1877.

During the period of placer mining, extensive hardrock prospecting was carried out, especially during the winter months when placer mines could not be worked. By the end of 1876 nearly 150 quartz mines had been located in the Deadwood area, and many were being actively developed. However, because of the uncertainty created by the continuance of Indian title to the area, major development efforts did not take place until after February 28, 1877. Shortly after the passage of the 1877 act, investment capital began to flow into the Black Hills, and the emphasis began to shift from placer to hardrock mining. In 1877, for the first time, gold production from the quartz mines exceeded production from the placers.

45. LAWRENCE COUNTY GOLD DEPOSITS; THE MINERAL BELT.

Lawrence County, the northernmost of the three counties covering the Black Hills mineral region, contained the major portion of the gold deposits in the subject tract. In Lawrence County the lode deposits occurred in two major areas -- the "mineral" or "Homestake" belt, and the "cement" mines. Together, the mineral belt and the cement mines have become one of the most productive gold mining regions in the history of the United States.

The mineral belt is a strong northwest trending zone of quartz veins in the hills surrounding Deadwood and Whitewood Creeks. On the belt are the extensive gold deposits which later become the properties of the Homestake Mining Company.

The cement deposits were gold deposits which occurred cemented in gravel. The deposits were considered to be ancient placers resulting from an earlier period of erosion of the quartz veins of the area. The cement mines were generally worked by underground methods.

Prior to 1877, mining activities in Lawrence County centered in the area around Deadwood and Lead. Rich placer deposits were being mined along Deadwood and Whitewood Creeks and their tributaries. Lode deposit discoveries in the area were reported as early as December 1875. Most of the major lode and placer deposits in Lawrence County were located prior to the date of valuation.

The Whitewood mining district -- also known as the Lead, Garden, or Homestake district -- includes an area approximately five miles in radius from Lead City. This district eventually became the most developed mining district in the entire Black Hills.

Soon after the extinguishment of Indian title, Mr. George Hearst, a California capitalist with mining experience, manifested an active interest in the mineral belt. Mr. Hearst and his associates employed an experienced practical miner to investigate the area and, after receiving favorable reports, began acquiring mining property on the mineral belt in late 1877. The Homestake Mining Company, incorporated by Hearst, thereafter pursued an active campaign to acquire control of the entire mineral belt. By 1880 Homestake controlled many of the prominent mines in the district. Eventually, the Homestake Mining Company absorbed 654 mining claims covering an area of 5,639 acres.

Initially, acquisition and control of the claims on the mineral belt were accomplished by five separate mining companies -- Homestake, Giant and Old Abe, Golden Terra, Highland and Deadwood. The major mining properties located on the mineral belt were, from south to north, Homestake, Golden Star, Nettie, Old Abe, Giant, American Flag, Palmetto, Amicus, Segregated Homestake, Homestake No. 2, Highland Chief, Golden Terra, Deadwood, and Father De Smet.

46. THE HOMESTAKE MINING COMPANY.

The Homestake Mining Company, incorporated November 25, 1877, originally controlled only three of the major claims on the mineral belt -- Homestake, Golden Star, and Nettie.

(a) Homestake claim. The Homestake claim was discovered in April 1876 by the Manuel brothers. They began development of the property using an arastra to process the ore. During the winter of 1876-77 they removed about five thousand dollars worth of gold. In December 1876, when operations were at a depth of thirty feet, with a vein forty feet wide, the Black Hills Pioneer described the amount of ore in sight as immense.

During the spring and summer of 1877, Moses Manuel continued to work the claim, working the ore through a ten stamp mill. During the summer of 1877 (possibly during the fall), Hearst and his associates acquired title to part of the Homestake claim for prices variously reported to be $50,000 for one-half interest, $70,000 for a whole interest, and $100,000 for a whole interest.

After inspecting the claim, Hearst wrote to his associates on November 1, 1877, that the Homestake vein was up to one hundred feet wide at some points, averaging thirty feet in width throughout. He estimated that the entire vein of the Homestake claim was at least 1500 feet long, thirty feet wide, and one hundred feet deep, and could not be exhausted by the constant operation of one hundred stamps for twenty five years.

In November 1877, the Mining and Scientific Press reported that the Homestake mine was producing at a rate of 150 tons per day. An eighty stamp mill was put into production during the summer of 1878, and production was reported to be two hundred tons per day with an average yield of fourteen dollars per ton.

(b) Golden Star claim. The Golden Star claim was discovered in April 1876. It was adjacent to the Homestake claim on the west and was of enormous extent. The mine was developed using an arasta to process ore, and, by the fall of 1876, four twenty foot shafts had been developed. By August 1877 three ten stamp mills were processing ore from the Golden Star.

The Homestake Company acquired part of the Golden Star prior to April 1878, probably at the same time as it acquired its interest in the Homestake, and for a probable price of about $35,000. On April 8, 1878, it was reported that the Homestake and Golden Star had been consolidated and that an immense amount of ore had been discovered.

An eighty stamp mill went into production during August 1878. By December 1878 the consolidated mines were producing at the rate of $60,000 per month, and an additional 120 stamp mill was on order.

(c) Nettie (Little Nettie) claim. The Nettie claim was adjacent to the Golden Star on the southwest. It was discovered in June 1876. In April 1877 the mine was producing good ore at a depth of ten feet. By April 1878 Little Nettie had been developed by a twenty-five foot tunnel and a thirty foot shaft. Throughout this period Hearst was attempting to acquire the Little Nettie. By spring 1879 the Homestake Company owned one-third of the mine, and in the fall of 1879 it acquired the remainder of Little Nettie.

(d). The Black Hills Journal of December 21, 1878, reported that the Homestake Company had rejected an offer of three million dollars for the Homestake and Golden Star mines. In February 1879 it was reported that the consolidated Homestake and Golden Star claims extended over the mineral belt for a length of 1350 feet and a width of 450 feet. The company's improvements were valued at $260,000. With its new 120 stamp mill in operation in September 1879, Homestake was reported to be processing a total of seven hundred tons of ore per day, with an average yield of twelve dollars per ton. Its estimated mining and milling costs were about three dollars per ton.

Homestake Company stock was first offered for sale in February 1878 for four dollars a share. By the end of 1878 the stock had risen to fifteen dollars per share. In January 1879 it was selling for $21

in New York, and by the end of 1879 the price had risen to about forty dollars per share.

47. THE GIANT AND OLD ABE MINING COMPANY.

The Giant and Old Abe Company was incorporated September 25, 1878, and ultimately controlled six claims in the mineral belt -- Giant, Old Abe, Palmetto, American Flag, Amicus, and Rothschild. All of these claims were located to the east of the Homestake properties.

(a) Giant claim. The Giant Claim was reportedly discovered December 11, 1875. The claim was the subject of a protracted title dispute which caused a lag in its development. However, by May 1877, the mine was developed by a forty foot tunnel, and first class ore was being removed. The claim was reportedly sold in June 1877 to Professor Cherry of Chicago along with the Clara No. 1. The March 16, 1878, edition of Engineering and Mining Journal reported that Giant had previously been sold for $42,500.

In May 1878, George Hearst urged his associates that the Giant claim be acquired. He observed that the south half of the claim was the most valuable ground in the Black Hills and that hundreds of thousands of dollars were invested in it. Although noting that the quartz was not very rich, Hearst stated that the amount of ore that would pay a profit was enormous, and that neither his associates nor their children would live to see the time when the Giant could no longer be worked for a profit.

(b) Old Abe claim. The record does not indicate the discovery date of the Old Abe claim. However, there is evidence that by April 1877

it had been developed by a fifty foot tunnel. In the spring of 1877 it was bonded for five thousand dollars, and the bond was not claimed. During the fall the "big chute" in the Old Abe was struck. In December 1877 the Old Abe was sold for fifty thousand dollars. By July 1878 sixty stamps were processing six hundred tons of Old Abe ore per week, with an average yield of twelve dollars per ton.

In September 1878, 1150 feet of the 1500 feet of the Old Abe was sold to a General Gashwiler for $165,000. Four days later it was resold to the Homestake interests for a reported consideration of $250,000, which price also included interests in the Palmetto and American Flag claims. At this time the Old Abe was consolidated with Giant, and the Giant and Old Abe company was incorporated.

(c) Palmetto and American Flag claims. The Palmetto claim was located on June 15, 1876. The record does not indicate the discovery date of the American Flag, but by the beginning of May 1877 it was developed by a fifty foot tunnel. These claims overlapped in part the Homestake and Old Abe claims, and were located at the southeast end of the mineral belt. The claims were operated together and in June 1878 the ore was reported as being very rich. In September 1878 interests in these two mines were purchased by General Gashwiler for a total of thirty thousand dollars. He immediately resold them, along with Old Abe, to the Homestake interests in the transaction described above.

(d) Rochschild and Amicus claims. The Rothschild claim was discovered March 14, 1877. The discovery date of the Amicus is not indicated in the record. Prior to the acquisition of these properties

by the Giant and Old Abe Company only surface development work had been done. Even after acquisition in September 1878, less work was done on these claims than on other Homestake properties.

(e) The earliest reported sale of stock of the Giant and Old Abe Company was on December 9, 1878, when 250 shares sold at six dollars per share on the San Francisco Stock Exchange. During 1879 the price of the stock ranged between two and seven dollars.

48. THE GOLDEN TERRA MINING COMPANY; THE DEADWOOD MINING COMPANY.

The Golden Terra Mining Company was incorporated on January 24, 1878. The Deadwood Company was incorporated October 4, 1878. The principal asset of each of these companies was an interest in the Golden Terra and Ophir claims.

The Golden Terra claim was discovered February 21, 1876. The Ophir claim was discovered June 7, 1876. By June 1876 the owners of the Golden Terra had drifted thirty-five feet into the hill and had sunk a shaft to a depth of fifteen feet. On January 29, 1877, undisclosed interests in both the Golden Terra and the Ophir were sold for a price of $50,000. In April 1877, a ten stamp mill was put into operation. Milled gold yielded ten dollars per ton, while production costs averaged about two dollars per ton. It was reported in April 1877 that the Golden Terra had a visible ore body one hundred feet thick with thirty million dollars in gold ore in sight.

In November 1877, the northern one thousand feet of the Golden Terra claim and the northern five hundred feet of the Ophir claim were

sold to the Homestake syndicate for $80,000. When the Deadwood Mining Company was incorporated late in 1878, title in these claims was deeded to it, and the claims became known as the Deadwood Mine.

In January 1878, the southern portion of the Golden Terra and Ophir claims were sold to the newly organized Golden Terra Mining Company for $60,000. These claims were thereafter operated as the Golden Terra Mine.

Between January 1878 and June 1879, the Golden Terra Mine produced 16,316 tons of ore, with an average yield of $7.70 per ton and an estimated cost of three dollars per ton or less. For the Deadwood Mine, during the period its ore was processed by outside mills, 35,992 tons of ore was produced with an average yield of $7.62 per ton and costs of $4.72 per ton. When Deadwood installed its own mills, the average yield was about $7.13 per ton and the production costs were about $1.99 per ton.

In May 1878 stock of the Golden Terra Company sold for $1.90 per share. In September 1878 the price had risen to between $3.50 and $4.50 per share, and by June 1879 the price was at a high of $15.75 per share.

In November 1879 a 40% interest in the Deadwood Mine was sold for $800,000. In the last ten months of 1879, after the installation of a sixty stamp mill, gross production on the Deadwood Mine was between $42,000 and $45,000 per month, with a profit between $32,000 and $35,000 per month.

In December 1880 the Deadwood and Golden Terra companies were consolidated into the Deadwood-Golden Terra Mining Company. The

Deadwood-Golden Terra mines continued producing until 1898 with a total production of $11,073,065.

49. THE HIGHLAND MINING COMPANY.

The Highland Mining Company was incorporated on October 4, 1878. Its primary assets were five mining claims -- Homestake No. 2, Highland Chief, Emma, Golden Prospect, and Segregated Homestake.

(a) Homestake No. 2 claim. The Homestake No. 2 claim was an eight hundred foot extension of the Homestake claim which was discovered on June 20, 1876. On December 1, 1876, it was sold to an R. Gwin for a reported consideration of $400. On November 1877, Hearst disclosed to his associates that he had offered to purchase an interest in the Homestake No. 2 at a price equivalent to $50,000 for the entire claim. On February 23, 1878, the claim was reported to be producing 125 tons of ore daily. At that time an interest in the claim was sold for over $100,000. In April 1878 another sale was reported for an undisclosed figure, presumably to the Hearst syndicate. In October 1878, a Homestake agent purchased an additional interest in the claim for $75,000.

(b) Highland Chief claim. The Highland Chief claim was located in September 1876. It was situated north of the Old Abe claim and to the east of Homestake No. 2. In February 1877 it was reported to have a twenty-six foot vein with extremely rich ore. By April 1878 the claim had a shaft 140 feet in depth, and an immense amount of ore of excellent quality was in sight. In May 1878 the Highland Chief was consolidated

with the Homestake No. 2, with the ore from both being processed in a thirty stamp mill. The Black Hills Daily Times of November 29, 1878, reported that the Highland Chief and the Homestake No. 2 had been acquired for a price of $103,500, with an additional $20,000 for machinery.

(c) Golden Prospect claim. The Golden Prospect claim was discovered June 21, 1876. Portions of the claim were mortgaged in July and September 1878, and foreclosed at sheriff's sales. The property was acquired by the Homestake interests in several transactions for unknown considerations.

(d) Emma claim. The Emma claim was discovered May 15, 1876, and was located southwest of the Homestake No. 2. The record contains little information of this claim. In October 1878 it was incorporated into the Highland Company with the Homestake No. 2 and the Highland Chief.

(e) Segregated Homestake claim. The Segregated Homestake claim consisted of the northern ends of the Homestake and Golden Star claims which were originally held by owners who were unwilling to sell when Hearst acquired the Homestake and Golden Star. In December 1878, it was reported that the Segregated Homestake was processing thirty-five tons of ore per day in a twenty stamp mill. On June 2, 1878, the Homestake interests purchased the Segregated Homestake claim for $106,000.

50. THE FATHER DESMET MINING COMPANY.

The Father DeSmet Mining Company ultimately owned six claims -- Father DeSmet, Golden Gate, Justice, Belcher, Gopher, and Golden Terra Extension. Although the exact dates of discovery are not indicated in the record, it is clear from other evidence that the first four of

these claims had been discovered prior to the date of valuation.

The Father DeSmet claim was discovered in the spring or summer of 1876. It was located at the northwestern end of the mineral lode. In November 1876 a quartz mill was under construction at the Father DeSmet, and by December 1876 a 32 foot by 14 foot crevice was being worked with solid gold in sight. In May 1877, four arastras working at the Father DeSmet produced five to eight thousand dollars worth of bullion per week. In November 1877 George Hearst wrote to his associates that the Father DeSmet was "the greatest gold mine yet discovered in the world. The pay streak is over 400 feet wide and has but little waste or worthless material in it. . . . In this lode, all other veins to the south seem to have come together and the result is such a deposit of ore as I never saw or dreamt of before." Pl. Ex. F-19, p. 2.

The Golden Gate claim was located to the north-northeast of the Father DeSmet and Deadwood claims. In September 1887 the Golden Gate was reported to be producing twenty tons of ore per day.

The Justice claim was located south of the Father DeSmet claim and west of the Deadwood claim.

The Belcher claim was located west of the Father DeSmet and north of the Justice claims. In June 1876 Belcher was described as a rich gold quartz ledge.

The Gopher claim, located to the southeast of the Golden Terra and Ophir claims, was apparently not discovered until Febraury 1878. The Golden Terra Extension claim was located between the Gopher and the

Homestake No. 2 claim. The record does not indicate its discovery date. In February 1878 the Golden Terra Extension was reported sold for $150,000.

In December 1877, the Father DeSmet, Golden Gate, Justice, and Belcher claims were sold for $400,000. In March 1878 the DeSmet Company employed one hundred men and was using seventy-five stamps to process the ore from the Father DeSmet mine. During the next year the Father DeSmet mine reportedly produced 25,800 tons of ore from which nearly $300,000 in pure gold was extracted.

In May 1879 the Father DeSmet Company was reorganized. The Father DeSmet and Belcher mines were retained, and the Golden Gate and Justice were placed in separate companies. At the same time, the DeSmet Company also purchased the Gopher and Golden Terra extension claims for a total of $200,000.

In December 1880 the Homestake group acquired the Father DeSmet Company. The Black Hills Times of December 29, 1880, indicated that the sales price was probably close to one million dollars. The DeSmet mine continued to operate until 1886. Its total production was $3,259,382.

51. THE CALEDONIA MINING COMPANY

The Caledonia Mining Company owned eight claims in the Whitewood mining district -- Caledonia, Clara, Clara No. 2, Bobtail, Cornucopia, Monroe, Queen of the Hills, and Grand Prize. The first six of these claims were discovered prior to the valuation date.

In May 1878, a one hundred foot interest in Caledonia sold for

$5,000. Three months later the entire claim was sold to the Caledonia Mining Company for $65,000. A nine hundred foot portion of the Queen of the Hills claim and all of the Grand Prize claim were acquired in December 1878 for $25,000, and made part of the Caledonia Mining Company. The Caledonia claim was recognized as rich, but the extent of its gold ore was subject to further development.

The Black Hills Pioneer of July 29, 1876, rated the Clara claim as being one of the richest and most promising veins in the country. This claim was involved in many reported sales. In the fall of 1876 Clara was reported sold for either $50,000 or $70,000. In June 1878 two 1/5 interests in Clara were reported sold for $6000 and $4000 respectively. The August 23, 1879, edition of the Engineering and Mining Journal stated that Clara had sold about a year earlier for $30,000. In October 1878 a 450 foot segment of the claim sold for $20,000.

In June 1879 Clara was consolidated with Caledonia, Queen of the Hills, and Grand Prize. Later an interest in Clara No. 2 was also obtained. At some time prior to 1887 the Caledonia Company was acquired by the Homestake syndicate.

52. OTHER LODE PROPERTIES IN THE WHITEWOOD MINING DISTRICT

Several other companies owned and operated productive claims in the Whitewood district. The record contains only partial information on these companies and their operations. Among the claims controlled by these smaller companies were Sir Roderick Dhu, Rose, Rattler, Cheyenne, Oro, Hoodelburg, Red Jacket, Pierce, Sams, Sunshine, Bingham, Clipper, and Nevada. Some of these claims had not yet been discovered on the

date of valuation.

53. EXTENT AND QUALITY OF THE ORE BODY OF THE MINERAL BELT; YIELD AND COST OF OPERATION

(a) George Hearst expressed his views concerning the size of the mineral belt, and its potential yield and costs of operation, in a report to his associates Haggin and Tevis dated November 1, 1877. He stated:

> I know you will think it strange that 75 feet in surface width does not cover our vein but it is nevertheless true. The "Homestake" pay vein is more than 100 feet wide at the point where we came in conflict with the "Star" and I am certain it will average from one end of the Homestake to the other, thirty (30) feet. By milling several hundred tons and other thorough investigations the ore has been found to average $14.00 to $15.00 per ton. The ore is easily mined and being very free is easily saved.
>
> Labor supplies and everything necessary are as cheap as in Colorado and I think the entire expense per ton for mining and milling will not exceed $4.00 certainly not $5.00.
>
> Sixty to 70% of the assay value of the ore can be saved. . . . We should not have less than one-hundred stamps and that number of stamps can not work out the mine in 25 years. Figure it yourselves, how many tons of ore are there in a pile 1500 feet long 30 feet wide and 100 feet deep?
>
> These figures are inside of the facts and safe to rely upon.
>
> The veins lies between quartzita and laminated slate, dipping about 70 degrees east with every indication favorable to its continuing to great depth. I think the veins is safe from any disturbances for at least 1000 feet and probably for 2000 feet. This big vein on which our claim is located travels the country north of us for about a mile and a half next to us on that side is the Homestake No. 2 and 800 feet claim near our line they have run a tunnel which goes through one vein being hard rock. The rock in these two veins worked in the mills yields from $9.00 to $17.00 per ton all of which is corraborated by the sampling that we have done.

> Next north of us and adjoining the "Homestake No. 2" is our part of the "Golden Terry" or rather the 800 feet of that claim on which we hold a bond. Work on this mine has proven that the vein is about 100 feet wide and that the pay streaks are three (3) in number and ranging from 12 to 20 feet in width.
>
> North of "Golden Terry" is the "Golden Terry #2" a small ravine separating the two claims. The vein in the "Golden Terry #2" is enormous being over one-hundred feet in width and they are running a mill and working about thirty tons per day which amount of ore is extracted by four or five men. Their ore is paying $15.00 per ton, some more and some less. This location runs north in and through the mountain 1000 feet.
>
> Next adjoining the "Golden Terry #2" on the north is the "Father de Smet" mine which is opened on the north slope of the bluff of Deadwood Creek. This mine, I assert is the greatest gold mine yet discovered in the world. The pay streak is over 400 feet wide and has but little waste or worthless material in it. This mine has been for sometime and is now having ore worked at "Elliots Mill" and an old acquaintance of mine informs me that it pays $20.00 per ton. [PL Ex. F-19, pp 1-2]

(b) During the period in which they were acquiring mining properties on the mineral belt, the Hearst interests employed Louis Janin, an experienced mining engineer, as an adviser. In July 1879, Mr. Janin completed a report on the properties of the mineral belt. His report covered most aspects of the value of the claims, including location, geology, transportation, freight rates, topography, fuel, water supply, wages, costs of products, yields of the ore, and availability of ore.

In his report Janin stated that the main developments on the mineral belt were confined to a main channel of ore, about one mile long, between the Homestake claim on Gold Run and the Father DeSmet claim on Deadwood Creek. The width of the belt varied, with veins being spread over two thousand feet at one point, but rarely exceeding six hundred feet in

the region where the best claims were located. Janin stated that the width of the individual veins ranged from ten to over one hundred feet, with one of the veins of the Homestake claim, at the south end of the mineral belt, being over 150 feet, and one of the veins of the DeSmet claim, at the north end of the belt, being 93 feet in width. He further stated that,

> The veins follow the configuration of the surface of the belt as it passes from creek to creek, and the ore is found at the highest and lowest elevations - which vary as much as 500 feet in altitude - and throughout its length. [Pl. Ex. F-1, Vol. III, p. 223.]

Janin noted that the gold was remarkably free, and was worked to a higher percentage than the gold in the California ores. However, the sulphurets, in which some of the gold appeared, were poorer than those in the California viens. In concluding his comments on the mineral belt, Janin stated,

> Compared with other veins . . . we have here one of the most uniform and longest stretch of gold-bearing deposits that has occurred in the history of mining. I know of no mines which are similar to these on the western coast of America. The majority of the California veins are in slates of Jurassic age, and therefore are much younger than those of the Black Hills. These latter, with their overlying conglomerates, have points of resemblance - especially in their age and mode of occurrence - to those of Dahlonega and to others on the Appalachian gold belt, and more particularly to some of the famous gold mines of Brazil; but the results which have been already obtained from a limited section of these mines of the Black Hills, would seem to indicate a value which is far beyond the value of these other mines. [Id.]

Janin also reported on the mining operations which had been carried out by the Homestake companies. The production figures contained in the Janin report are summarized in the following table:

Company	Tons of ore processed	Net Yield 12/	Ave. Net Yield per ton 12/
Homestake (through 6/30/79)	67,069	$605,668.54	$ 9.03
Giant & Old Abe (prior to 9/78)	11,486	108,761.21	9.49
Giant & Old Abe (9/78 thru 6/30/79)	6,532	54,627.41	8.36
Highland	12,235	71,678.39	5.86
Golden Terra	16,316	125,740.14	7.70
Deadwood (thru 6/30/79)	35,992	274,132.99	7.62

In reporting these production figures, Janin noted that many of them were only partial figures.

Janin reported that the production costs experienced with processing at the eighty stamp Homestake mill were approximately four dollars per ton. These costs included labor at the mine, labor at the mill (including transportation of the ore), mining supplies and mill supplies.

Janin predicted that with the addition of the one hundred twenty stamp mill at Homestake production would increase to 150,000 tons per year for that company.

(c) At or around the date of valuation the professional mining publications and other commentators were cautioning inexperienced investors about investing in mining properties. The general advice was to invest only in currently producing mines, and to place little if any worth in unopened mining properties. It was noted that few of the claims made

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12/ Except in the case of the production from the Giant and Old Abe Company prior to its acquisition by the Homestake interests, for which period only gross production figures are available, net yield represented the yield after deduction of charges for expressage, insurance, coinage, and other nonproduction expenses.

their owners rich; most barely paid their owners' living expenses.

(d) On the valuation date, a knowledgeable and well informed prospective purchaser, and a knowledgeable and well informed seller, would have been justified in estimating that the total amount of ore in the mineral belt was equivalent to a single uninterrupted vein 5000 feet long, 30 feet wide, and 750 feet deep. Such a vein would contain 9,375,000 tons of ore. A knowledgeable and well informed buyer, and a knowledgeable and well informed seller, would also have been justified in estimating that a single mining operation, in mining and processing all the ore of the mineral belt, would realize an average yield of $7.50 per ton and incur an average cost of $4.00 per ton. Preproduction costs would reasonably have been estimated at $1,500,000.

54. THE CEMENT MINES OF LAWRENCE COUNTY

The cement mines in the vicinity of Deadwood were the earliest lode deposits to be worked in the Black Hills. All but one of the major cement mines had been discovered prior to February 28, 1877. The first quartz mill, which arrived in the Hills in September 1876, initially processed cement ores. By early 1878, twenty mills, with a total of five hundred stamps, were working on these ores. The gold was free milling and daily production was similar to that from the quartz deposits. The amount of ore was limited, and the cement mines were exhausted by 1881.

The grade of the ore varied widely. Some of the early production was reported at several hundred dollars per ton, but most of the ore processed yielded ten to twenty dollars per ton. Costs of production of the cement ore were reported to be less than five dollars per ton.

On the valuation date, a knowledgeable and well informed purchaser, and a knowledgeable and well informed seller, would have been justified in estimating that the cement deposits could be worked by a single unified operation utilizing one hundred stamps and processing two hundred tons of ore per day, and that at this rate the cement mines would have an expected life of four years. A knowledgeable and well informed buyer, and a knowledgeable and well informed seller, would have likewise been justified in estimating that in processing all the cement ore a single operation would realize an average yield of twelve dollars per ton and incur an average cost of five dollars per ton. Preproduction costs would reasonably have been estimated at $250,000.

55. THE BALD MOUNTAIN AREA OF LAWRENCE COUNTY

The Bald Mountain area or district was located in Lawrence County several miles to the west of Lead and the Whitewood District. None of the major claims in the Bald Mountain area had been discovered by the valuation date, and this area would not have been known to a purchaser or seller on February 28, 1877.

56. THE BEAR BUTTE MINING DISTRICT

The Bear Butte district was located in Lawrence County approximately ten miles east of Lead. The mines in this district contained the first significant discoveries of silver in the Black Hills, and in this district

silver was the principal mineral, although gold and lead were also produced. Most of the significant claims in the district were discovered prior to the valuation date, and by the end of 1880 over 250 claims had been located in the district.

On the valuation date, a knowledgeable and well informed purchaser, and a knowledgeable and well informed seller, would have been justified in estimating that a single unified operation mining and processing the ores of the Bear Butte district would produce fifty tons of ore per day, and that at this rate the Bear Butte mines would have an expected life of five years. A knowledgeable and well informed purchaser, and a knowledgeable and well informed seller, would also have been justified in estimating that a consolidated operation would realize an average yield of thirty-five dollars per ton and incur an average cost of twenty-five dollars per ton in processing the ores of the Bear Butte district. Preproduction costs would have been estimated at $200,000.

57. SMALL MINING DISTRICTS IN LAWRENCE COUNTY

(a) Ida Gray or False Bottom Mining District. The Ida Gray district embraced all the claims in the drainage of False Bottom Creek, northwest of Lead. The district was organized July 15, 1876, and the significant claims in the district were located and production had begun prior to the valuation date. The records for the district indicate that 171 lode claims were recorded by the end of 1880.

(b) Spruce Gulch Mining District. Spruce Gulch is located about one mile east of Lead and flows north to join Whitewood Creek

east of Deadwood. None of the major claims of the Spruce Gulch district had been discovered by the valuation date, and this area would have been unknown to a buyer or seller on February 28, 1877.

(c) Germania Mining District. The Germania district was located along Eel Creek, about seven miles southeast of Lead. None of the claims of the Germania district were discovered prior to the valuation date, and a purchaser and seller would not have known of this area on February 28, 1877.

58. SALES STATISTICS FOR LAWRENCE COUNTY.

The record contains evidence of sales of lode mining claims obtained from the official records of Lawrence County. This evidence is necessarily incomplete because the Lawrence County records were destroyed by fire in 1879, and many of the claims and sales of claims were not rerecorded. 13/ The total monetary consideration involved in the sales that are recorded are as follows:

All sales through December 31, 1876	$ 808,890
All sales through December 31, 1877	2,775,900
All sales through December 31, 1878	5,897,415
All sales through December 31, 1879	8,813,685
All sales through December 31, 1880	15,296,270

59. PLAINTIFFS' APPRAISAL OF LAWRENCE COUNTY LODES.

Mr. Full, plaintiffs' mineral appraiser, relied primarily on a

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13/ Many of the significant sales reported in Findings 46 through 51, for example, do not appear in the official Lawrence County records.

future income approach in valuing the lode mineral properties in Lawrence County. He divided his appraisal into several parts, assigning separate values to the mineral belt, the cement mines, the Bald Mountain area, the Bear Butte district, and the small districts, Ida Gray, Spruce Gulch, and Germania.

(a) The Mineral Belt. In his report, Mr. Full examined the claims on the mineral belt one by one. He concentrated on the date of discovery, early development, the amount of production, the cost of operation, contemporary observations on the extent and quality of the ore body, and the sales of the claim. Mr. Full also included in his report the views expressed by George Hearst and Louis Janin concerning the extent and quality of the entire mineral belt.

Based upon all this information, and upon the assumption of unified ownership of the entire mineral belt, Mr. Full assumed that a knowledgeable buyer in 1877 would have conservatively estimated the size of the mineral belt lode as 5,000 feet long, 30 feet wide, and 1,000 feet deep.[14/] Then using the formula

$$\text{Tons of ore} = \frac{\text{Length of ore zone X width of zone X depth of zone}}{\text{Cubic feet of ore per ton}}$$

Mr. Full calculated that the mineral belt would contain 12,500,000 tons of ore. Mr. Full then estimated the potential life of the operation at 25 years with an annual production of 500,000 tons per year.

14/ Mr. Full noted that it is normal in mineral appraisals to estimate the depth at one-half the exposed length, but that considering the unprecedented size of the mineral belt the buyer would have conservatively estimate a one thousand foot depth.

He also assumed a production year of 350 days, with an average daily production of 1,430 tons.

Based on production and cost figures in the record, Mr. Full assumed that the well informed purchaser would have estimated an average yield of seven to nine dollars per ton, and an average cost of two to four dollars per ton. In addition, based upon a need for a milling capacity of six hundred stamps, and the evidence of record that a two hundred stamp mill at Homestead had cost $503,475, Mr. Full estimated a preproduction cost of $1,500,000. Mr. Full summarized the production estimates which a prospective purchaser would have arrived at in the following table:

Annual production	500,000 tons
Daily production (350 days)	1,430 tons
Average yield per ton	$7.50
Annual return on production	$3,750,000
Average cost of production per ton	$4.00
Annual cost of production	$2,000,000
Annual net profit	$1,750,000
Net profit per ton	$3.50
Expected life of operation	25 years
Pre-production costs	$1,500,000

[Pl. Ex. F-1, Vol. I, p. 158.]

Mr. Full expressed his opinion that a purchaser of the mineral belt, in light of the risk and the prevaling economic conditions, would have expected a return of 15% on his investment. Then using the Inwood premise under which the buyer would receive the return of his capital from production and a return of 15% compounded, Mr. Full calculated that the fair market value of the mineral belt, before preproduction costs, was $11,312,175. Deducting preproduction costs, Mr. Full concluded that the fair market value of the mineral belt was $9,812,175.

(b) The Cement Mines. Mr. Full also examined the cement mines on a claim by claim basis concentrating on factors similar to those he considered in valuing the mineral belt. Based upon this information and upon the assumption of unified ownership of all these claims, Mr. Full assumed that a knowledgeable buyer in 1877 would have conservatively estimated that one hundred stamps would process 200 tons of cement ore daily for 350 days per year, and that at this rate the cement mines would have an expected life of 4 years.

Based on evidence in the record of production and costs, Mr. Full assumed that a well informed purchaser would have estimated an average yield of ten to twenty dollars per ton, and an average cost of six dollars per ton. He also estimated that preproduction costs would be $250,000. Mr. Full summarized the production estimates which a prospective purchaser would have arrived at in the following table:

Daily production	200 tons
Annual production (350 days)	70,000 tons
Average yield per ton	$12
Annual return from production	$840,000
Average cost of production per ton	$ 6
Annual cost of production	$420,000
Annual operating profit	$420,000
Net profit per ton	$ 6
Expected life of operation	4 years
Pre-production costs	$250,000

[Pl. Ex. F-1, Vol. I, p. 206.]

Mr. Full expressed his opinion that, in light of the risk and the prevailing economic conditions, a purchaser of the cement mines would have expected a return of 20% on his investment. Using the Inwood premise, Mr. Full then calculated that the preproduction

value of the cement mines was $1,087,254. Deducting preproduction costs, Mr. Full concluded that the fair market value of the cement mines was $837,254.

(c) Bald Mountain Area. Mr. Full also analyzed the Bald Mountain area on a claim by claim basis. Based on this information, which indicated, among other things, that recovery of gold from the ores mined in this area was more difficult than from the other ores mined in the Black Hills, Mr. Full estimated that that fair market value of the Bald Mountain area was $100,000.

(d) Bear Butte Mining District: Mr. Full examined the Bear Butte district on a claim by claim basis, concentrating on factors similar to those he had considered in valuing the other districts. Based on this information, and upon the assumption of common ownership of all the claims, Mr. Full assumed that a knowledgeable buyer in 1877 would have conservatively estimated that the mines in this district could be operated successfully on the basis of the figures in the following table:

Daily production	50 tons
Annual production (350 days)	17,500 tons
Average yield per ton	$35
Annual return on production	$612,500
Average cost of production per ton	$25
Annual cost of production	$437,500
Annual operating profit	$175,000
Net profit per ton	$10
Expected life of operation	5 years
Pre-production cost	$[200,000]

[Pl. Ex. F-1, Vol. I, p. 250]

Mr. Full expressed his opinion that, in light of the risks involved, a purchaser of the Bear Butte District would have expected a return on his investment of 15%. Applying the Inwood premise, Mr. Full calculated a preproduction value for the district of $586,635. Deducting preproduction costs, Mr. Full concluded that the fair market value of the Bear Butte District was $386,635.

(e) Ida Gray, Spruce Gulch, and Germania mining districts. Mr. Full briefly examined the evidence in the record relating to the Ida Gray, Spruce Gulch, and Germania districts. He then stated his opinion that the fair market value of these three districts was $30,000.

60. DEFENDANT'S APPRAISAL OF LAWRENCE COUNTY LODES.

Mr. Oberbillig, defendant's mineral appraiser, relied primarily on a market data approach in valuing the Lawrence County lode deposits. He also used a future income method to confirm his results.

In his report, Mr. Oberbillig examined several sales of mineral properties in Lawrence County. Included were the sale of the Homestake claim (possibly including the Golden Star) for $113,000; the sale of the Golden Terra claim for $35,000; the sale of the Father DeSmet, Golden Gate, Justice, and Belcher claims for $400,000; the sales of the Palmetto and American Flag claims for $15,000 each; the sale of the Old Abe claim for $160,000; the sale of the Pierce claim for $60,000; and the sale of the Caledonia claim for $65,000. Mr. Oberbillig then grouped the sales by mining company, as indicated in the following table:

1.	Homestake Golden Star	$105,000 (?)
2.	DeSmet	400,000
3.	Giant and Old Abe	190,000
4.	Caledonia	60,000
	TOTAL	$755,000

[Def. Ex. M-48, p. 83.]

Mr. Oberbillig then assumed that, with the most important mines on the belt selling for about $750,000, which cumulative sales price he assumed to be equivalent to their fair market value, the remaining

claims[15/] must be worth an additional $400,000. Mr. Oberbillig concluded that the fair market value of the Lawrence County gold belt was $1,150,000.

In his future income method, Mr. Oberbillig relied principally on the Janin Report. Based on Janin's figures, Mr. Oberbillig estimated that in 1879 the Hearst properties had a minimum expected life of ten years, and a maximum expected life of twenty years, with increased rise in the period from ten to twenty years. In addition, using Janin's predictions that the Homestake Company would realize a yearly profit of between $375,000 and $750,000, Mr. Oberbillig projected an annual profit for this mine of $500,000 per year. He then divided the profit, assigning half to the owners of the mines and half to the operators.

Mr. Oberbillig next calculated the value of the mineral belt using the Inwood premise at various interest rates and time periods. His results are indicated in the following table:

Rate of Return	Ten Years	Twenty Years
15%	$1,254,700	$1,564,825
20%	1,048,125	1,217,400
25%	892,625	988,475

He chose the values at 15% for ten years and 20% for twenty years as being most proper, and assigned a fair market value of $1,250,000 as of July 1879. He then discounted this value back to February 1877 at

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15/ The claims involved in this category were Emma, Homestake No. 2, Highland, Segregated Homestake, Golden Star, Golden Terra Extension, Ophir, Golden Terra, Northern Part of Ophir, Northern Part of Golden Terra, and Gopher.

25% compound interest and obtained a value for the Homestake mine of $750,000. Mr. Oberbillig then assumed that the Homestake mine was worth as much as all the remaining Lawrence County lode deposits together. He therefore concluded that the fair market value of the Lawrence County lodes was $1,500,000.[16/] In addition, Mr. Oberbillig valued the Lawrence County silver deposits at $120,000.

In its proposed findings of fact defendant adopted Mr. Oberbillig's market data approach, but used more sales than did Mr. Oberbillig. The sales relied upon by defendant are indicated in the following table:

Name	Sale Date	Amount
Father DeSmet) Golden Gate) Belcher) Justice)	December 1877	$ 400,000
Golden Terra) Ophir) Deadwood)	January 28, 1877	50,000
Gopher) Golden Terra Ext.)	May 1879	200,000
Clara	June 1878	30,000
Highland Chief) Homestake No. 2)	November 1878	103,500
Emma	Fall of 1877	50,000
Old Abe) Segregated Old Abe)	Fall of 1877	45,000

16/ On cross-examination, Mr. Oberbillig resolved the apparent inconsistency in the values obtained using the two methods by revealing that in the market data method he had failed to include $350,000 for the value of the cement mines.

Name	Sale Date	Amount
Homestake	November 1877	$ 70,000
Golden Star	November 1877	35,000
Segregated Homestake	June 1879	106,000
Nettie	Fall 1879	20,000
Giant	Winter of 1878	42,500
American Flag	September 1878	15,000
Palmetto	September 1878	15,000
	Total	$1,182,000

Defendant apparently accepted Mr. Oberbillig's conclusion that the fair market value of the Lawrence County lodes was $1,500,000.

61. VALUE OF LAWRENCE COUNTY LODES.

Based upon all the evidence in the record, and the preceding findings, the Commission finds that on February 28, 1877, the fair market value of the lode deposits of Lawrence County was $6,500,000, broken down as follows:

Mineral belt	$5,550,000
Cement mines	700,000
Bear Butte district	240,000
Ida Gray district	10,000

62. LAWRENCE COUNTY PLACER DEPOSITS.

The earliest discovery of placer gold in Lawrence County took place in 1875 on Bear Gulch. Initial discoveries on Deadwood and Whitewood Gulches were made in November 1875 and January 1876. Placer gold in

Lawrence County occurred in the Whitewood mining district, and along Boulder Gulch.

(a) Whitewood mining district. Most of the placer production in Lawrence County came from the Whitewood district. Placer claims extended three hundred feet along the stream bed, and from rim to rim across the gulch. The claims were identified numerically in order above and below the discovery claim.

The exact amount of placer gold production is not indicated in the record. However, various contemporary accounts estimate the Whitewood placer production to have been between one and two million dollars in 1876, and between one and one-half and two million dollars in 1877. It was also reported that by 1880 from six to eight million dollars of placer gold had been produced.

As early as 1877 reports began to appear that the Whitewood placers were nearly worked out. The placers were in fact exhausted by 1880. As did other placers in the Black Hills, the Deadwood placers occasionally suffered from insufficient water supplies.

The exact number of placer claims in the Whitewood district is not certain, but the record contains evidence of at least 174 claims, distributed as follows: Deadwood Creek - 30; Whitewood Creek - 79; Blacktail Gulch - 8; Bobtail Gulch - 18; Gold Run Gulch - 14; Two Bit Gulch - 25.

The record contains evidence that the initial sales of the Deadwood Gulch placer claims were for an aggregate consideration of $155,100.

In 1876, the average placer in the Whitewood district was being worked by three men. Laborers were receiving an average salary of $3.50 to $4.50 per day. The average laborer could produce twenty dollars of gold per day.

On the valuation date, a knowledgeable and well informed purchaser, and a knowledgeable and well informed seller, would have been justified in estimating that the placers in the Whitewood district had a remaining expected life of two years; that in the first year a total of 150 claims could be worked by a total of 450 men for 180 days, with an average yield of twenty dollars per miner day, and an average cost of production of seven dollars per miner day; and that in the second year a total of one hundred claims could be worked by a total of three hundred men for 180 days with an average yield of fifteen dollars per miner day, and an average cost of seven dollars per miner day.

(b) Boulder Gulch. Boulder Gulch is a small creek located five to six miles east of Deadwood in Lawrence County. Placer deposits were first located in June 1876, and many claims were staked out along the gulch. The area was particularly susceptible to water shortages and it was necessary to build a ditch from Whitewood Creek to guarantee a water supply.

On the valuation date, a knowledgeable and well informed purchaser, and a knowledgeable and well informed seller, would have been justified in estimating that the Boulder Gulch placers had a remaining expected life of two years; that in the first year a total of twenty-five claims

could be worked by a total of seventy-five men, for 180 days, with an average yield of ten dollars per miner day, and an average production cost of seven dollars per miner day; and that in the second year a total of twenty-five claims could be worked by a total of seventy-five miners for 180 days, with an average yield of eight dollars per miner day, and an average production cost of seven dollars per miner day.

63. THE PARTIES' APPRAISAL OF LAWRENCE COUNTY PLACERS.

(a). Plaintiffs. In his valuation of Lawrence County placers, Mr. Full relied upon a future income method. Initially Mr. Full examined individually the claims on Deadwood and Whitewood Creeks, Blacktail, Bobtail, Gold Run and Two Bit Gulches. He considered many of the factors he had considered in valuing the lode deposits. He also reviewed the evidence on the amount of gold production, the number of claims, the costs of labor, and the production yields.

Based upon this information, Mr. Full assumed that a knowledgeable buyer would have recognized the following production potential for the Whitewood district placers:

First Year (1877)

Number of claims	150
Average number of miners	450
Number of working days	180
Number of miner days	81,000
Average yield per miner shift	$20
Average cost of production per miner shift	$ 7
Annual production	$1,620,000
Annual net gain	$1,053,000

Second Year (1878)

Number of claims	150
Average number of miners	300
Number of working days	180
Number of miner days	54,000
Average yield per miner shift	$15
Average cost of production per miner shift	$ 6
Annual production	$810,000
Annual net gain	$486,000

Third Year (1879)

Number of claims	100
Average number of miners	200
Number of working days	180
Number of miner days	36,000
Average yield per miner shift	$10
Average cost of production per miner shift	$ 6
Annual production	$360,000
Annual net gain	$144,000
Total production (1877-1879)	$2,790,000
Total net gain (1877-1879)	$1,683,000

[Pl. Ex. F-1, Vol. I, p. 280.]

Mr. Full expressed his opinion that, in light of the risk involved, a purchaser of the Whitewood placers would have expected a return of 25% on his investment. Discounting the annual net gains by 25% compound interest, Mr. Full obtained values of $842,400 for 1877, $311,040 for 1878, and $73,728 for 1879. Adding these figures, Mr. Full concluded that the fair market value of the Whitewood district placers was $1,227,168.

Mr. Full used a similar method to appraise the Boulder Gulch placers. After examining the claims one by one, he assumed that a knowledgeable buyer would have estimated that these placers could be successfully operated on the following schedule:

First Year (1877)

Number of claims	25
Average number of mines	75
Number of working days	180
Number of miner days	13,500
Average yield per miner shift	$10
Average cost of production per miner shift	$ 7
Annual production	$135,000
Annual net gain	$ 40,500

Second Year (1878)

Number of claims	25
Average number of mines	75
Number of working days	180
Number of miner days	13,500
Average yield per miner shift	$ 8
Average cost of production per miner shift	$ 6
Annual production	$108,000
Annual net gain	$ 27,000
Total production (1877-1878)	$243,000
Total net gain (1877-1878)	$ 67,500

[Pl. Ex. F-1, Vol. I., p. 284.]

Again discounting by yearly interests of 25% compounded, Mr. Full calculated values of $32,400 for 1877, and $17,280 for 1878. Adding these figures, he concluded that the fair market value of the Boulder Gulch placers was $49,680.

(b) Defendant. Mr. Oberbillig relied upon a market data approach in appraising the Lawrence County placers. He first examined the evidence of placer production, and reviewed the development of the placer mines. He then examined the records of the "Lost Mining District" and obtained evidence of sales of claims in Deadwood Gulch, which he summarized in the following tables:

DEADWOOD PLACERS

ABOVE DISCOVERY

Discovery		$ 6,000
1		3,000
2	$800	(3,000)
3		3,250
4		2,000
5		4,200
6		3,250
7		4,000
8		15,000
9		15,000
10		2,000
11		1,500
12		1,500
13		15,000
14		1,200
15 - 21	7 Claims at $1,000	7,000
22		400
23		(500)
24 - 25	$500 each	1,000
26 - 29	4 Claims at $250	1,000
30		500
31 - 32		500
33 - 37		800
38 - 63	25 Claims at $100	2,500
		$ 94,100

DEADWOOD PLACERS

B E L O W D I S C O V E R Y

1)	$ 3,000
2)	
3	2,000
4)	
5)	2,500
6	1,500
7	1,500
8	1,000
9	1,000
10	4,000
11	2,500
12	2,500
13	2,500
14	2,500
15	2,500
16	1,000
17	1,500
18	1,500
19	1,000
20	1,500
21	2,000
22	2,500
23	5,000
24)	
25)	5,000
	$ 50,000

[Def. Ex. M-48, pp. 59, 60.]

Mr. Oberbillig concluded that the fair market value of the Deadwood placers was $144,100.

After examining contemporary reports of the other Whitewood placers, Mr. Oberbillig estimated that together they would be worth as much as the Deadwood placers. He concluded that the fair market value for all the placers of Lawrence County on February 28, 1877, was $288,000.

64. VALUE OF LAWRENCE COUNTY PLACER DEPOSITS.

Based upon all the evidence in the record, and the preceding findings, the Commission finds that on February 28, 1877, the fair market value of the placer deposits of Lawrence County was $1,130,000.

65. PENNINGTON COUNTY LODE DEPOSITS.

The lode deposits of Pennington County became a significant source of mineral wealth in the Black Hills. By the end of 1880 over two thousand lode claims had been filed, and more than seventeen separate mining districts had been formed. On the valuation date, however, few, if any, of the major lode claims in the county had been discovered, and a purchaser or seller would not have considered Pennington County a potential hard rock mining area.

66. THE PARTIES' APPRAISALS OF PENNINGTON COUNTY LODE DEPOSITS.

(a) Plaintiffs. Mr. Full examined the Pennington County lode deposits on a district by district basis, and in many districts he reported on individual claims. He considered the same factors he had

examined in appraising the Lawrence County lodes. Based on this information, and upon the assumption of unified ownership and operation of all the claims in the county, Mr. Full assumed that a knowledgeable buyer in 1877 would have estimated that the Pennington County lode mines could be profitably operated on the basis of the figures in the following table:

Daily production	150 tons
Annual production (350 days)	52,500 tons
Average yield per ton	$7
Annual return from production	$367,500
Average cost ofproduction per ton	$4
Annual cost of production	$210,000
Annual operating profit	$157,500
Net profit per ton	$3
Expected life of operation	5 years
Pre-production costs	$150,000

[Pl. Ex. F-1, Vol. 1, p. 330.]

Mr. Full expressed his opinion that, in light of the risks involved, a prospective purchaser on the valuation date would have expected a return of 30% on his investment. Applying the Inwood premise, Mr. Full calculated a preproduction value of $383,607. Deducting preproduction costs, Mr. Full concluded that the fair market value of the lode deposits of Pennington County was $233,607.

(b) Defendant. Mr. Oberbillig examined several of the Pennington County lode districts in his report. He concluded that none of these districts had any market value on the valuation date.

67. VALUE OF PENNINGTON COUNTY LODE DEPOSITS.

Based upon all the evidence in the record, and the preceding findings, the Commission finds that on February 28, 1877, the Pennington County lode deposits had no market value.

68. PENNINGTON COUNTY PLACER DEPOSITS.

(a) Three major streams, Rapid, Spring, and Battle Creeks, flow from west to east through Pennington County. Placer gold deposits occurred on all three of these streams and on some of their tributaries. With several exceptions, these deposits had been discovered prior to the date of valuation, and claims had been staked for miles along the streams, and at various dry locations in close proximity to the streams.

In 1875 the Jenney expedition discovered placer gold on Spring Creek and Rapid Creek, and on Castle Creek, a tributary of Rapid Creek. In his report Jenney stated that the Rapid Creek - Castle Creek area was destined to be the most productive area in the hills. He noted that for forty miles along the course of these creeks the banks were bordered by deep and extensive placers.

An influx of miners followed Jenney's 1875 expedition and the report of gold discoveries. In July 1875, 150 miners were reported working on Castle Creek. Placer mining took place on a number of locations along Battle Creek and its tributaries. Several mining districts were organized before the valuation date.

The early individual miners worked within the channels of the streams to recover relatively high-grade placer gold concentrations.

In addition to these concentrations, there were "dry diggings" located in and along the dry tributary gulches and "high bars" or terrace deposits of gravels located as much as 100 feet above the elevation of the stream. These placer holdings could not be efficiently worked by primitive hand methods employing wheelbarrows and rockers. Many of the stream gravels were too deep to be worked by hand or there was inadequate water, particularly in a dry season. The deposits from the high bar placers and hill deposits away from the streams were moved by wagon or wheelbarrow to chutes built to slide pay dirt down to the water for working. Even under these crude conditions large amounts of gold were produced. It was known that large deposits of gold-bearing dirt and gravel were present but that the development of the placer deposits required the investment of capital in dams and flumes to bring the water to the deposits in order to mine by the hydraulic system, as was ultimately done.

Once valid title was assured by the extinguishment of Indian title by the Act of February 28, 1877, mining companies were organized and capital raised to develop the properties. Extensive improvements were completed on all three of the major streams. Miles of flumes and ditches were constructed with storage and diversion dams to insure a continuing supply of water during the dry season.

(b) On the valuation date, a knowledgeable and well informed buyer, and knowledgeable and well informed seller, would have been justified in estimating that the placers of Rapid Creek and its tributaries had a

remaining expected life of three years; that during the first year these placers could be worked by a total of four hundred miners working 180 days, with an average yield of ten dollars per miner day, and an average cost of seven dollars per miner day; that in the second year the remaining placers could be worked by a total of three hundred miners working 180 days, with an average yield of nine dollars per miner day, and an average cost of seven dollars per miner day; and that during the third year the remaining placers could be worked by a total of two hundred miners working 180 days, with an average yield of eight dollars per miner day, and an average cost of seven dollars per miner day.

(c) On the valuation date, a knowledgeable and well informed purchaser, and a knowledgeable and well informed seller, would have been justified in estimating that the placers of Spring Creek and its tributaries had a remaining expected life of three years; that during the first year these placers could be worked by three hundred miners working 180 days, with an average yield of ten dollars per miner day, and an average cost of seven dollars per miner day; that during the second year the remaining placers could be worked by 250 miners working 180 days, with an average yield of nine dollars per miner day, and an average cost of seven dollars per miner day; and that during the third year the remaining placers could be worked by 150 miners working 180 days, with an average yield of eight dollars per miner day, and an average cost of seven dollars per miner day.

(d) On the valuation date, a knowledgeable and well informed buyer, and a knowledgeable and well informed seller, would have been justified in estimating that the placers of Battle Creek and its tributaries had a remaining expected life of two years; that in the first years these placers could be worked by 150 miners working 180 days, with an average yield of ten dollars per miner day, and an average cost of seven dollars per miner day; and that in the second year the remaining placers could be worked by one hundred men working 180 days, with an average yield of nine dollars per miner day, and an average cost of seven dollars per miner day.

69. THE PARTIES' APPRAISALS OF PENNINGTON COUNTY PLACER DEPOSITS.

(a) Plaintiffs. Mr. Full examined the Pennington County placers district by district. Mr. Full then used his future income approach to value the placers on Battle, Spring, and Rapid Creeks.

Based on the information that he had obtained by evaluating the Battle Creek placers, Mr. Full assumed that a knowledgeable buyer in 1877 would have estimated that these placers could be profitably operated on the basis of the following figures.

First Year (1877)

Average number of miners	150
Number of working days	180
Number of miner days	29,000
Average yield per miner shift	$10
Average cost of production per miner shift	$ 7
Annual production	$290,000
Annual net gain	$ 87,000

Second Year (1878)

Average number of miners	100
Number of working days	180
Number of miner days	18,000
Average yield per miner shift	$ 9
Average cost of production per miner shift	$ 6
Annual production	$162,000
Annual net gain	$ 54,000

Third Year (1879)

Average number of miners	50
Number of working days	180
Number of miner days	9,000
Average yield per miner shift	$ 8
Average cost or production per miner shift	$ 6
Annual production	$72,000
Annual net gain	$18,000
Total production (1877-1879)	$524,000
Total net gain (1877-1879)	$159,000

[Pl. Ex. F-1, Vol. I, p. 356.]

Then, based upon the information he had obtained by examining the placers of Spring Creek and its tributaries, Mr. Full assumed that a knowledgeable buyer would have recognized the following production potential for these placers:

First Year (1877)

Average number of miners	300
Number of working days	180
Number of miner days	54,000
Average yield per miner shift	$10
Average cost of production per miner shift	$ 7
Annual production	$540,000
Annual net gain	$162,000

Second Year (1878)

Average number of miners	250
Number of working days	180
Number of miner days	45,000
Average yield per miner shift	$ 9
Average cost of production per miner shift	$ 6
Annual production	$405,000
Annual net gain	$135,000

Third through Fifty Years (1879-1881)

Average number of miners	150
Number of working days (per year)	180
Number of miner days (per year)	27,000
Average yield per miner shift	$ 8
Average cost or production per miner shift	$ 5
Annual production	$216,000
Annual net gain	$ 81,000

Total production (1877-1881)	$1,593,000
Total net gain (1887-1881)	$ 540,000

[Pl. Ex. F-1, Vol. I, pp. 369-370.]

In addition, based upon the information he had obtained in evaluating the placers of Rapid Creek and its tributaries, Mr. Full assumed that a knowledgeable buyer would have estimated that these placers could be successfully operated on the following schedule:

First Year (1877)

Average number of miners	400
Number of working days	180
Number of miner days	72,000
Average yield per miner shift	$10
Average cost of production per miner shift	$ 7
Annual production	$720,000
Annual net gain	$216,000

Second Year (1878)

Average number of miners	300
Number of working days	180
Number of miner days	54,000
Average yield per miner shift	$9
Average cost of production per miner shift	$6
Annual production	$486,000
Annual net gain	$162,000

Third through Fifth Years (1879-1881)

Average number of miners	200
Number of working days (per year)	180
Number of miner days (per year)	36,000
Average yield per miner shift	$8
Average cost of production per miner shift	$5
Annual production	$288,000
Annual net gain	$108,000

Total production (1877-1881)	$2,070,000
Total net gain (1877-1881)	702,000

[Pl. Ex. F-1, Vol. I, p. 373.]

Mr. Full next expressed his opinion that, considering the risks involved, a purchaser of all of the Pennington County placers would have expected a return of 25% on his investment. Discounting the total net incomes from all three streams by 25% compound interest, Mr. Full obtained values of $372,000 for 1877, $224,640 for 1878, $105,984 for 1879, $77,414 for 1880, and $61,932 for 1881. Adding these figures, Mr. Full concluded that the fair market value of the Pennington County placers was $841,970.

(b) Defendant. Mr. Oberbillig used a royalty approach in valuing the placers of Pennington County. He hypothesized a production of

$400,000 per year for ten years from the placers, and a capital investment of $1,000,000 for construction of a large flume and a hydraulic mining system, which investment would be recovered at the rate of $100,000 per year. He then assumed that the owner of the mineral property would receive yearly 10% of the $300,000 net profit. Then applying the Inwood premise at interest rates of 15%, 20%, and 25%, Mr. Obergillig calculated values of $150,000, 126,000, and $107,000. Finally, because his approach was based upon "conjecture and pure assumption of future yield," Mr. Oberbillig concluded that the fair market value of the Pennington County placers was no more than $100,000.

70. VALUE OF PENNINGTON COUNTY PLACER DEPOSITS.

Based upon all the evidence in the record, and the preceding findings, the Commission finds that on February 28, 1877, the fair market value of the placer deposits of Pennington County was $525,000.

71. CUSTER COUNTY MINERALS.

(a) Gold. Custer County was the southernmost county in the Black Hills gold region. The first gold officially reported in the Black Hills was located in Custer County by members of the Custer party on French Creek in August 1874. Although the first lode claim was recorded in 1875, few of the remaining lode claims in the county were discovered prior to the date of valuation. By the end of 1877, a total of 249 claims were of record. By the end of 1879, there were 950 recorded claims and several mining developments were in progress. Some placer

mining took place all along French Creek and on tributaries to Battle Creek, but it was not extensive.

(b) Mica. Prior to the valuation date, miners recognized mica deposits in Custer County. As early as June 1878, a mica mine was in operation. An 1884 report describes 11 operating mica mines. A ready market in Chicago paid $2.00 to $15.00 per pound. Mica was extracted over the period 1879 through 1963. The first period of mining was from 1879 to 1884. The next from 1906 to 1911. During World War II about $1,174,000 worth of mica was mined. From 1952 to 1963, mica was mined and sold to the Government. In 1963 production ended. A total of 7,067,537 pounds of sheet mica and 52,049 tons of scrap mica were taken from the Black Hills for the period 1879 through 1963, with a value of $4,080,779,

72. THE PARTIES' APPRAISALS OF CUSTER COUNTY MINERALS.

(a) Plaintiffs. Mr. Full examined the evidence of record on the Custer County lode gold, placer gold, and mica deposits. Based on this information he stated his opinion that an informed buyer or seller in 1877 would have valued the mineral potential of Custer County at $40,000.

(b) Defendant. Mr. Oberbillig examined the evidence of record on the Custer County minerals. Based on an estimated yearly gold production of $250,000, Mr. Oberbillig calculated the value of a ten year 10%

royalty discounted at 25%. He concluded that the value of the lode and placer gold deposits was $90,000. He further estimated that the value of the mica deposits was $25,000.

73. VALUE OF CUSTER COUNTY MINERALS.

Based upon all the evidence of record, and the preceding findings, the Commission finds that on February 28, 1877, the fair market value of the mineral deposits of Custer County was $40,000.

74. OTHER MINERALS OF THE BLACK HILLS.

The Black Hills contained valuable minerals in addition to gold and mica. Tin was known to be present in 1876 but it was 1883 before it was found in quantity in Pennington County and later in Lawrence County. Efforts to produce the tin were not profitable.

Tungsten was found in the Black Hills in the early 1880's and about $1,378,694 in ore and concentrates were extracted from 1898 through 1963.

Coal was found in June 1877 in western Wyoming near the Black Hills, and a year later coal was found in the Black Hills. The total production of coal from the Black Hills, including the northwestern portion in Wyoming, was reported at $31 million.

Oil springs were discovered in Custer County early in 1878, but the industry did not advance.

Neither the parties nor their expert witnesses attached any value to these minerals. The Commission finds that on February 28, 1877, these miscellaneous mineral deposits had no market value.

75. VALUE OF MINERAL LANDS.

Based upon all the evidence in the record, and all the preceding findings on minerals, the Commission finds that on February 28, 1877, the fair market value of all the mineral lands in the subject tract was $8,200,000.

76. TOTAL VALUE.

On February 28, 1877, the entire subject tract had a fair market value of $17,100,000.

77. GOLD MINED PRIOR TO FEBRUARY 28, 1877.

Article II of the Treaty of April 29, 1868, 15 Stat. 635, 636, after describing the boundaries of the Great Sioux Reservation, which included the subject area, provided as follows:

> . . . and the United States now solemnly agrees that no persons except those herein designated and authorized so to do, and except such officers, agents, and employes of the government as may be authorized to enter upon Indian reservations in discharge of duties enjoined by law, shall ever be permitted to pass over, settle upon, or reside in the territory described in this article, or in such territory as may be added to this reservation for the use of said Indians, . . .

As has already been indicated in findings 4 and 5, above, the United States failed to keep unauthorized persons, including non-Indian prospectors and miners, from entering onto the subject tract, and, at least after the Allison Commission failed to induce the Sioux to cede the Black Hills to the United States, adopted a policy and took specific actions which encouraged unauthorized persons to enter

onto the subject tract. As a result of this policy and these actions many nonIndians entered the subject tract, established towns, organized mining districts, filed and developed mining claims, and mined and removed gold from the Great Sioux Reservation. The plaintiffs have never received any compensation for gold mined and removed prior to February 28, 1877.

78. THE PARTIES APPRAISAL OF GOLD MINED PRIOR TO FEBRUARY 28, 1877.

(a) Plaintiffs. In a letter written to Mr. Myers, plaintiffs' general appraiser, on April 13, 1970, Mr. Full stated his opinion as to the extent of gold production prior to the date of valuation. After reviewing the evidence of early production from the Pennington County placers, the Lawrence County placers, and the Lawrence County cement mines, Mr. Full concluded that the gross value of the gold removed prior to February 28, 1877 was as follows:

Pennington County Placers	$200,000
Lawrence County Placers	2,000,000
Lawrence County Cement Mines	50,000
Total	$2,250,000

Mr. Full further estimated that the net operating profits derived from this gold production was as follows:

Pennington County Placers	$ 50,000
Lawrence County Placers	1,000,000
Lawrence County Cement Mines	25,000
	$1,075,000

(b) Defendant. In a letter to defendant's attorney written on June 12, 1970, Mr. Oberbillig expressed his opinion as to the extent of gold production prior to the date of valuation. Mr. Oberbillig accepted Mr. Full's conclusions as to the gross value of the gold removed prior to February 28, 1877. However, in the instances of the placer gold operations in Pennington and Lawrence counties, he stated his opinion that Mr. Full's estimates of net profit were too high.

Mr. Oberbillig calculated the costs to the placer operations from wages, tools, water, and stripping operations. For the Lawrence County placers these costs totaled $1,710,000 for the year 1876. Mr. Oberbillig concluded that the net profit from the placer operations could not be more than 10% of the gross production.

79. VALUE OF GOLD MINED PRIOR TO FEBRUARY 28, 1877.

Based upon all the evidence in the record, and the preceding findings, the Commission finds that the gold mined from the subject tract prior to February 28, 1877, had a gross value of $2,250,000, and a value in the ground to plaintiffs of $450,000.

80. DESIGNATION OF WAGON ROADS.

At its 1877 session, the Legislative Assembly of Dakota Territory authorized the establishment of three wagon roads through the Sioux reservation from the Missouri River to the Black Hills. As Dakota Territory had no jurisdiction over the reservation, an understanding was reached under which the President of the United States would approve

the selection of routes made by the commissioners appointed by the territorial governor. The routes were surveyed during the winter of 1877. In April 1877 the War Department issued a circular which recognized and approved the three routes, as follows:

> Route No. 1. Beginning at Bismarck, Dakota, the present western terminus of the Northern Pacific Railroad. It will cross the 103d meridian of longitude (the western boundary of the Sioux Reservation) on the shortest and most practicable route to Deadwood City.
>
> Route No. 2. Beginning at a point on the right bank of the Missouri River, known as Fort Pierre, or at some point not more than eighteen miles north of that place, it will cross the 103d meridian on the shortest and most practicable route to Deadwood City.
>
> Route No. 3. Beginning at the Yankton crossing of the Missouri River; thence up the south bank of the Missouri and Niobrara rivers to its crossing opposite the mouth of the Keha-Paha River; thence up the latter to near the source of Porcupine Creek to the 103d meridian, on the shortest and most practicable route to Custer City.
>
> All people who establish themselves at stations along these lines are notified that such establishing will not carry with it any proprietary right to the land, which will be subject to conditions which may be imposed by the secretary of war. [Pl. Ex. CB-18: 1 G. Kingsbury, History of Dakota Territory 981 (1915).]

81. COMPENSATION STATED IN THE 1877 ACT.

Article 5 of the Act of February 28, 1877, 19 Stat. 254, 256, provides as follows:

> In consideration of the foregoing cession of territory and rights, and upon full compliance with each and every obligation assumed by the said Indians, the United States does agree to provide all necessary aid to assist the said Indians in the work of civilization;

to furnish to them schools and instruction in mechanical and agricultural arts, as provided for by the treaty of 1868. Also to provide the said Indians with subsistence consisting of a ration for each individual of a pound and a half of beef, (or in lieu thereof, one half pound of bacon,) one-half pound of flour, and one-half pound of corn; and for every one hundred rations, four pounds of coffee, eight pounds of sugar, and three pounds of beans, or in lieu of said articles the equivalent thereof, in the discretion of the Commissioner of Indian Affairs. Such rations, or so much thereof as may be necessary, shall be continued until the Indians are able to support themselves. Rations shall, in all cases, be issued to the head of each separate family; and whenever schools shall have been provided by the Government for said Indians, no rations shall be issued for children between the ages of six and fourteen years (the sick and infirm excepted) unless such children shall regularly attend school. Whenever the said Indians shall be located upon lands which are suitable for cultivation, rations shall be issued only to the persons and families of those persons who labor, (the aged, sick, and inform excepted;) and as an incentive to industrious habits the Commissioner of Indian Affairs may provide that such persons be furnished in payment for their labor such other necessary articles as are requisite for civilized life. The Government will aid said Indians as far as possible in finding a market for their surplus productions, and in finding employment, and will purchase such surplus, as far as may be required, for supplying food to those Indians, parties to this agreement, who are unable to sustain themselves; and will also employ Indians, so far as practicable, in the performance of Government work upon their reservation.

John T. Vance, Commissioner

Richard W. Yarborough, Commissioner

Margaret H. Pierce, Commissioner

Brantley Blue, Commissioner