Although these mills are owned by four separate companies, they are all, with the exception of the last, under the management of the Homestake superintendent. Thus it follows that the working details of the six mills are all, as far as practicable, after one model—the Homestake. The Caledonia mill stands alone, and works on a very different rock. Therefore the details of the plant differ considerably from those of the others. The details will therefore be summarised under two heads—Homestake and Caledonia.

"Outline of Plant and Process.

"The crushing is done by means of rock-breakers and stamps. The breakers first reduce the ore to a size suitable for stamps. The ore arriving at the highest level of the mill in the mine-cars, is discharged from the side or bottom of the car over grizzlies to the crushing-floor, or it goes direct to the crusher-hopper. The small-ore particles passing through the grates of the sizing-screen, and the coarse ore, which has been reduced by the rock-breaker, both drop into the same ore-bin, which reaches down to the cam-floor. Water is fed continuously into the mortars, and forms with the ore a liquid pulp, which passes through a screen at the front on to and over the apron-plates on the lower floor of the building. The Caledonia mill has blankets on the lower end of these plates to catch any coarse, heavy particles; in the other mills the pulp passes directly from the apron-plates to the mercury plates, and through them on to sluice-plates. From the traps placed at one end of these the pulp runs into one main sluice, which may again have one or more traps before the pulp is finally allowed to run to waste. Thus the entire process of passing the auriferous coarse rock from the ore-floor to the final discharge at the end of the main sluice is an automatic one.

"Battery amalgamation is used to extract the gold. It begins in the mortar, where mercury is added at intervals—while the continuous fine crushing with stamps is taking place—and ends on the apron-plates, where nearly all the amalgam not retained by the inside amalgamated copper plates is daily collected, any deficiency in the collecting mercury and amalgam on the plates being supplemented by the various traps. As the mills on the belt have to treat low-grade ores, it is necessary to their profitable operations that large amounts should be put through as rapidly as may be, and that at the same time as much gold as possible should be saved by simple means. To effect this a compromise is made between the two extreme methods of gold-milling. One of these aims at extracting as much gold as possible in the battery at the expense of capacity; the other, by amalgamating outside the battery, increases the crushing-capacity, but requires a number of expensive operations to recover the gold. In the Black Hills amalgamation is carried on both inside and outside the battery, thus combining the simple way of recovering the gold from the first method with the large capacity of the second. The aim is to crush rapidly to the desired fineness, and arrange the amalgamation so that it shall be adapted to the large amount of pulp produced.

"General Features of the Mills.

"The following table gives a comparative view of the dimensions, power, batteries, and product of the mills:—

Name of Mill.	Dimensions (*a*).			Boilers (*b*).		Engines.			Five-stamp Batteries.					Product.		
	Length in Feet.	Width in Feet.	Vertical Distance of Crusher-floor above Bottom of Ore-bin, in Feet.	Number.	Cords of Fire-wood consumed in Twenty-four Hours.	Type.	Cylinders. Diameter.	Cylinders. Stroke.	Number.	Distance between Lines, in Feet.	Wght. Stamps (*c*).	Drop in Inches.	Number of Drops per Minute.	Tons of Quartz crushed per Stamp in Twenty-four Hours.	Tons milled in One Year.	Bullion produced.	Average Yield per Ton.
							Inches.				Lb.					£	s. d.
Homestake ..	100	80	14¼	2	11	A	20	42	16	44½ (*d*)	850	9	85	4·5	96,790 (*e*)	184,445	15 2
Golden Star..	120	88¾	23¾	4	14	B	20	60	24	36 (*d*)	850	9	85	4·5	146,565 (*e*)		
Highland ..	112	92	22¾	4	14	C	26	60	24	46 (*d*)	850	9	85	4·5	146,013 (*f*)	83,902	11 5¾
Deadwood ..	112	46	22¾	2	11	A	20	42	16(*i*)	*k*	850	9	85	4·5	216,361 (*f*)	130,509	12 0¾
Golden Terra	112	46	22¾	2	11	A	18(*h*)	42	16(*i*)	*k*	850	9	85	4·5			
Fath'r de Smet	68	60	40	2	11	A	20	42	20	36 (*l*)	850	9	85	4·5			
Caledonia ..	84	46⅔	..	2	..	D	20	30	12	*k*	850	12	74	3·3	73,422 (*m*)	60,395	16 3

"The following is an explanation of the letters employed in the table:—

"A. Horizontal 155-horse-power engine, with Meyer's cut-off. B. 300-horse-power Corliss engine. C. 350-horse-power Corliss engine, Fraser and Chalmers pattern. D. Two 60-horse-power horizontal engines, with automatic cut-off. (*a.*) Length and width are always of mill proper, excluding the engine-room. (*b.*) The boilers in the table are all horizontal, tubular, 54in. in diameter, 16ft. long, with 46 tubes of 3½in. in diameter. Steam-pressure is kept at 90lb. per square inch. (*c.*) Made up as follows: Wrought-iron stern—length, 14ft.; diameter, 3⅛in.; weight, 340lb.: cast-iron-head, 240lb.—height, 18in.; diameter at top, 9in.; at bottom, 8in.: cast-iron shoe, 140lb.—cylindrical butt, 8in. high and 8¼in. diameter; tapering shank, 4½in. diameter at the base, 3½in. at top, and 5in. long, the shoe being made of white iron, chilled for 6½in. from the base, the next 1½in. and the shank being cast in sand and cooled slowly: cast-iron gib-tappet or disc—diameter at ends, 9¼in.; in the middle cylindrical part, 6in.; wearing-faces, 2½in. thick; middle part, 7in. long; total length, 12in.; weight, 130lb. Total, 850lb, stem, head, shoe, and disc or tappet, being proportioned as 34, 24, 14, 13. (*d.*) Batteries in two rows, back to back, leaving this space between the rows for ore-bins and feeders. (*e.*) From June, 1887, to May, 1888, inclusive. (*f.*) Estimated from report of Homestake Company, June, 1888, when product of 200 stamps in company's mill is given as 243,355 tons for the year ending the 30th May, 1888, or 1,216·775 tons per stamp. (*k.*) Batteries in single line. (*l.*) Batteries in two rows, but face to face, with this space between them. (*m.*) Intentionally slower, crushing on harder rock than the other mills. (*n.*) For year ending the 30th April, 1888.