

NAMES OF MINES.

Location indicated on the map by numbers.

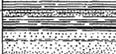
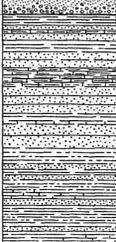
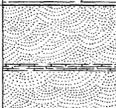
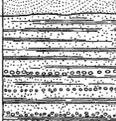
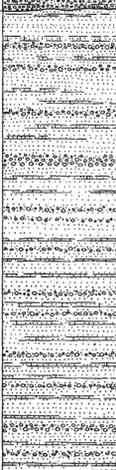
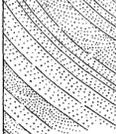
NUMERICAL LIST.

1. Johnny Bull.
2. Gold Anchor Tunnel.
3. Albion.
4. Caledonia Shaft.
5. Utah.
6. Marriage Stake.
7. Hand-out Shaft.
8. Golden 1900.
9. Belzora.
10. San Juan.
11. Zenith.
12. Christina Shaft.
13. Lackawanna.
14. Flying Fish.
15. Flying Fish Upper Tunnel.
16. Southern Consolidated Tunnel.
17. Puzzler.
18. Petzite.
19. Great Western.
20. Mohawk.
21. Hess and Garren Tunnel.
22. Puzzle Extension (incline).
23. Puzzle (main shaft).
24. M. A. C. Upper Tunnel.
25. M. A. C. Lower Tunnel.
26. Hoosier Girl Shaft.
27. Ontario.
28. Dolly Tunnel.
29. J. E. Watson Tunnel.
30. Governor.
31. A. B. G.
32. C. V. G.
33. Hureka.
34. Wabash.
35. Blaine and Logan Tunnel.
36. Pigeon.
37. Logan Tunnel.
38. Logan No. 2 Shaft.
39. Leap Year.
40. Monterey.
41. Silver Wing.
42. Undine.
43. Roger Tichborne Shaft.
44. Logan Shaft.
45. Pigeon Shaft.
46. C. H. C. Shaft.
47. C. H. C. Tunnel.
48. Limestone Tunnel.
49. Mountain Spring Tunnel.
50. Wellington Shaft.
51. Crebec Shaft.
52. Princeton.
53. M. M. P.
54. Iron Giant.
55. Lily D.
56. Logan Tunnel (site).
57. C. A. R.
58. Sambo.
59. Lake View.
60. Columbia.
61. Attec.
62. California.
63. Zulu Chief.
64. Magnet.
65. Eureka.
66. Uncle Remus Shaft.
67. Eagle.
68. Little Leonard.
69. Yankee Boy.
70. Shamrock.
71. Smuggler.
72. Atlantic Cable.
73. Riverside.
74. Montezuma.
75. Calumet.
76. Futurity Tunnel.
77. Grand View Incline.
73. Cobbler Shaft.
79. Alma Mater.
80. Phoenix No. 1 Level.
81. Pelican.
82. Last Chance.
83. Phoenix No. 4 Level.
84. Nellie Bly Lower Tunnel.
85. Nellie Bly Upper Tunnel.
86. Eureka.
87. Old Butler Tunnel.
88. Hope and Cross.
89. Bourbon.
90. Uncle Ned.
91. Worlds Fair.
92. Argentine.
93. Iron.
94. Laxy.
95. Mediterranean.
96. Black Hawk.
97. Allegheny.
98. Lelia Davis.
99. Little Maggie Shaft.
100. Wildcat Tunnel.
101. Privateer.
102. Sunflower.
103. Forest-Payroll.
104. Union-Carbonate Shaft.
105. Union-Carbonate Tunnels.
106. Fickle Goddess Tunnel.
107. South-Park.
108. Fortune and Duncan.
109. Eighty-eight.
110. Iron Dollar.
111. Hibernia.
112. Pro Patria Tunnel.
113. Revenue Return.
114. Onamo Tunnel.
115. Sceptical Shaft.
116. Golden Fleece.
117. Whim.
118. Western Tunnel.
119. Ironclad.
120. Bancroft Shaft.
121. Bancroft.
122. Derby and Evans Shaft.
123. St. Louis Shaft.
124. Argonaut.
125. Little Maggie Group.
126. Tomale.
127. N. A. Cowdrey.
128. Silver Swan.
129. Trinidad.
130. Deep Shaft.
131. Stephanite Tunnel.
132. Southern Tunnel.
133. Shehocton.
134. Syndicate Tunnel.
135. Stephens (old tunnel).
136. Stephens.
137. Chestnut.
138. Chestnut (old tunnel).
139. Klingender.
140. Swansea.
141. Lexington Tunnel.
142. Enterprise Group Tunnel.
143. Silver Age.
144. Wakeman Tunnel.
145. Isabella Shaft.
146. Stanley Shaft.
147. Air shaft.
148. Laura Shaft.
149. Durango.
150. Enterprise Shaft.
151. Songbird Shaft.
152. Jumbo Shaft.
153. Montezuma Shaft.
154. Vestal Shaft.
155. Aspen Shaft.
156. Silver Glance Shaft.

ALPHABETICAL LIST.

- A. B. G., 31.
- Air shaft, 147.
- Albion, 3.
- Allegheny, 97.
- Alma Mater, 79.
- Argentine, 92.
- Argonaut, 124.
- Aspen Shaft, 155.
- Atlantic Cable, 72.
- Aztec, 61.
- Bancroft, 121.
- Bancroft Shaft, 120.
- Belzora, 9.
- Black Hawk, 96.
- Blaine and Logan Tunnel, 35.
- Bourbon, 89.
- Caledonia Shaft, 4.
- California, 62.
- Calumet, 75.
- C. A. R., 57.
- C. H. C. Shaft, 46.
- C. H. C. Tunnel, 47.
- Chestnut, 137.
- Chestnut (old tunnel), 138.
- Christina Shaft, 12.
- Cobbler Shaft, 78.
- Columbia, 60.
- Crebec Shaft, 51.
- C. V. G., 32.
- Deep Shaft, 130.
- Derby and Evans Shaft, 122.
- Dolly Tunnel, 28.
- Durango, 149.
- Eagle, 67.
- Eighty-eight, 109.
- Enterprise Group Tunnel, 142.
- Enterprise Shaft, 150.
- Eureka, 65.
- Eureka, 86.
- Fickle Goddess Tunnel, 106.
- Flying Fish, 14.
- Flying Fish Upper Tunnel, 15.
- Forest-Payroll, 103.
- Fortune and Duncan, 108.
- Futurity Tunnel, 76.
- Gold Anchor Tunnel, 2.
- Golden Fleece, 116.
- Golden 1900, 8.
- Governor, 30.
- Grand View Incline, 77.
- Great Western, 19.
- Hand-out Shaft, 7.
- Hess and Garren Tunnel, 21.
- Hibernia, 111.
- Hoosier Girl Shaft, 26.
- Hope and Cross, 88.
- Hureka, 33.
- Iron, 93.
- Ironclad, 119.
- Iron Dollar, 110.
- Iron Giant, 54.
- Isabella Shaft, 145.
- J. E. Watson Tunnel, 29.
- Johnny Bull, 1.
- Jumbo Shaft, 152.
- Klingender, 139.
- Lackawanna, 13.
- Lake View, 59.
- Last Chance, 82.
- Laura Shaft, 148.
- Laxy, 94.
- Leap Year, 39.
- Lelia Davis, 98.
- Lexington Tunnel, 141.
- Lily D., 55.
- Limestone Tunnel, 48.
- Little Leonard, 68.
- Little Maggie Group, 125.
- Little Maggie Shaft, 99.
- Logan No. 2 Shaft, 38.
- Logan Shaft, 44.
- Logan Tunnel (site), 37.
- Logan Tunnel, 56.
- M. A. C. Lower Tunnel, 25.
- M. A. C. Upper Tunnel, 24.
- Magnet, 64.
- Marriage Stake, 6.
- Mediterranean, 95.
- M. M. P., 53.
- Mohawk, 20.
- Monterey, 40.
- Montezuma, 74.
- Montezuma Shaft, 153.
- Mountain Spring Tunnel, 49.
- N. A. Cowdrey, 127.
- Nellie Bly Lower Tunnel, 84.
- Nellie Bly Upper Tunnel, 85.
- Old Butler Tunnel, 87.
- Onamo Tunnel, 114.
- Ontario, 27.
- Pelican, 81.
- Petzite, 18.
- Phoenix No. 1 Level, 80.
- Phoenix No. 4 Level, 83.
- Pigeon, 36.
- Pigeon Shaft, 45.
- Princeton, 52.
- Privateer, 101.
- Pro Patria Tunnel, 112.
- Puzzle Extension Incline, 22.
- Puzzle Main Shaft, 23.
- Puzzler, 17.
- Revenue Return, 113.
- Riverside, 73.
- Roger Tichborne Shaft, 43.
- Sambo, 58.
- San Juan, 10.
- Sceptical Shaft, 115.
- Shamrock, 70.
- Shehocton, 133.
- Silver Age, 143.
- Silver Glance Shaft, 156.
- Silver Swan, 128.
- Silver Wing, 41.
- Smuggler, 71.
- Songbird Shaft, 151.
- Southern Tunnel, 132.
- Southern Consolidated Tunnel, 16.
- South Park, 107.
- St. Louis Shaft, 123.
- Stanley Shaft, 146.
- Stephanite Tunnel, 131.
- Stephens, 136.
- Stephens (old tunnel), 135.
- Sunflower, 102.
- Swansea, 140.
- Syndicate Tunnel, 134.
- Tomale, 126.
- Trinidad, 129.
- Uncle Ned, 90.
- Uncle Remus Shaft, 66.
- Undine, 42.
- Union-Carbonate Shaft, 104.
- Union-Carbonate Tunnels, 105.
- Utah, 5.
- Vestal Shaft, 154.
- Wabash, 34.
- Wakeman Tunnel, 144.
- Wellington Shaft, 50.
- Western Tunnel, 118.
- Whim, 117.
- Wildcat Tunnel, 100.
- Worlds Fair, 91.
- Yankee Boy, 69.
- Zenith, 11.
- Zulu Chief, 63.

# COLUMNAR SECTION

GENERALIZED SECTION FOR THE RICO QUADRANGLE.						
SCALE: 1 INCH = 400 FEET.						
SYSTEM	SERIES	FORMATION NAME	SYMBOL	COLUMNAR SECTION	THICKNESS IN FEET	CHARACTER OF FORMATIONS
CRETACEOUS	UPPER CRETACEOUS	Mancos shale.	Km		1000+	Soft, dark gray, or almost black, carbonaceous clay shale containing thin lenses or concretions of impure limestone. Embraces the Colorado group and a portion of the Pierre division of the Montana. Fossils occur more or less abundantly at several horizons.
		Dakota sandstone.	Kd		100-250	Gray or rusty brown quartzose sandstone or quartzite with a variable conglomerate, containing small chert pebbles at or near the base. Carbonaceous shale partings occur at several horizons and coal of poor quality is locally present. Indistinct fossil leaves occur sparingly.
JURASSIC		McElmo formation.	Jme		400-1000	A complex of alternating friable, fine-grained, yellowish or grayish sandstones and shales. The sandstones are seldom more than 20 feet thick. They often include flakes of grayish clay or shale. The shales are chiefly green in color, but may be pink, dark red, or chocolate brown. Some shale layers are sandy and others highly calcareous. No fossils have been found in the McElmo strata.
		La Plata sandstone.	Jlp		250-500	Consists principally of two massive, friable, white sandstone beds, with a narrow band of dark limestone or calcareous shale between them. The sandstones are quartzose, of even grain, distinctly cross bedded, and form massive cliffs where exposed. The limestone or calcareous shale is locally brecciated or cemented. No determinable fossils have been found.
TRIASSIC?		UNCONFORMITY				
		Dolores formation.	Fd		400	Sandy marl and fine-grained sandstone and shale of bright-red color with fine limestone conglomerate near the base, in which are found teeth of a crocodile ( <i>Belodon</i> ) and of a megalosauroid dinosaur, with a rare gasteropod shell similar to <i>viciparus</i> , indicating the Triassic age of the formation.
CARBONIFEROUS	PERMIAN?	UNCONFORMITY				
		Outler formation.	Cc		1600	A complex of bright-red sandstones and lighter red or pinkish grits and conglomerates alternating with sandy shales and earthy or sandy limestones of varying shades of red.
CARBONIFEROUS	PENNSYLVANIAN	Rico formation.	Cr		300	Dark reddish-brown sandstone and pink grit, with intercalated greenish or reddish shale and sandy, fossiliferous limestone.
		Hermosa formation.	Ch		1800-2000	A series of grits, sandstones, shales, and limestones of varying distribution and development. Grit and sandstone in massive beds predominate in the middle and upper parts of the section, the lower portion consisting of thinner bedded sandstone, shale, and limestone layers. Numerous invertebrate fossils occur in shale and limestone.
ALGONKIAN	DEVONIAN	UNCONFORMITY				
		Ouray limestone.	DCo		100-300	Dull yellow to buff, compact limestone, lower third shaly with thin quartzites. Abundant fossils indicate Devonian age of lower two-thirds and Mississippian age of upper part.
ALGONKIAN	BRUNN	UNCONFORMITY				
		Ignacio quartzite.	CI		0-200	Quartzite, massive and conglomeratic in lower part, thin bedded with shale and sandy partings in medial zone, succeeded by more massive quartzite. Light gray, pink, or yellow predominates. One shell, <i>obolus</i> sp. ? has been found near the middle of the formation.
ALGONKIAN		UNCONFORMITY				
		Uncompahgre formation.	Au			White or smoky quartzite and dark slate, mainly massive, but in a few places alternating in thinner layers. No fossils have been found.

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FIG. 1.—THE SOUTHEASTERN PEAKS OF THE RICO MOUNTAINS, FROM THE WEST SIDE OF THE DOLORES RIVER.  
In the center, on the sky line, is the porphyry cap of Dolores Peak, behind which rises Blackhawk Peak. Farther to the left is the north shoulder of Blackhawk Peak, with its light-colored porphyry cliffs. On the right is Whitecap Mountain, with its porphyry sheets, and in front of it Deadwood Gulch. Across the face of Dolores Mountain may be traced the limestone ledges in the middle of the Hermosa formation.



FIG. 2.—SANDSTONE MOUNTAIN, LOOKING ACROSS THE DOLORES FROM THE FOOT OF C. H. C. HILL.  
The view illustrates the character of cliff exposures formed by the alternating limestone, sandstone, and shale beds of the Hermosa formation, and the similar ones of the lower portion of the Dolores red beds in the knolls to the right. The crevice crossing the summit of Sandstone Mountain marks the line of a small fault.



FIG. 3.—DARLING RIDGE AND HORSE GULCH, FROM SANDSTONE MOUNTAIN.  
At the head of Horse Gulch, on the right, is Calico Peak; and on the left Anchor Mountain. The snow-covered slope of Darling Ridge on the left, from the creek to the forested crest, is wholly occupied by landslide debris. The Puzzle mine is situated at the foot of the snowy slope, in a landslide block.



FIG. 4.—TORRENTIAL FAN AT THE MOUTH OF AZTEC GULCH, FROM EAST SIDE OF THE DOLORES RIVER.  
Shows the characteristic form and grade of a torrential fan. The face at the bottom of the main fan is an erosion scarp cut by the river. A secondary fan is now being formed in front of that scarp.



FIG. 5.—TELESCOPE MOUNTAIN AND THE UPPER PART OF C. H. C. HILL, FROM SANDSTONE MOUNTAIN.  
The highest point is the summit of Telescope Mountain. On the left is a scarp of Hermosa and Rico strata. On the right is the ridge leading down to Nigger Baby Hill. The foreground and central part of the view show the landslide topography of C. H. C. Hill. The Pigeon vein, or "big fissure," runs beneath the snow-covered bench. The Pigeon mine buildings in foreground.

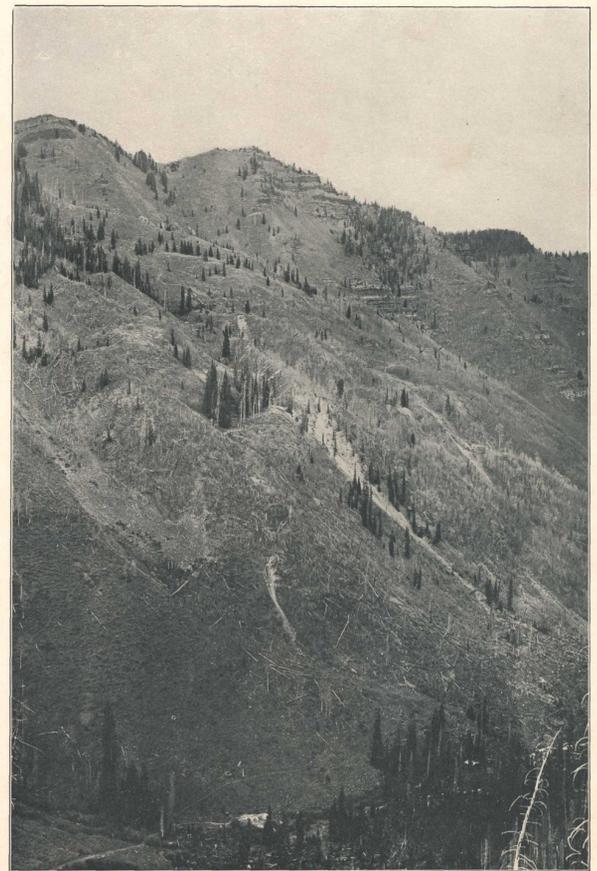


FIG. 6.—DETAILS OF LANDSLIDE TOPOGRAPHY IN THE AREA ON THE NORTH SIDE OF HORSE GULCH.  
The view shows characteristic landslide trenches, ridges, and mounds, where disintegration has smoothed out the originally more angular forms of slide blocks. In the background are strongly contrasting ledge outcrops.