A stylized "ankh," the ancient Egyptian sign for life, has been incorporated into the symbol of the Program on Man and the Biosphere (MAB).

CENTURY OF STRUGGLE AGAINST SNOW:

A History of Avalanche Hazard in San Juan County, Colorado

Betsy R. Armstrong

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UNITED STATES PROGRAM ON MAN AND THE BIOSPHERE
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INSTITUTE OF ARCTIC AND ALPINE RESEARCH • UNIVERSITY OF COLORADO

MAB

CENTURY OF STRUGGLE AGAINST SNOW:

A HISTORY OF AVALANCHE HAZARD

IN SAN JUAN COUNTY, COLORADO

by

Betsy R. Armstrong

San Juan Avalanche Project
Institute of Arctic and Alpine Research
University of Colorado
Boulder, Colorado 80309

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and tundra ecosystems

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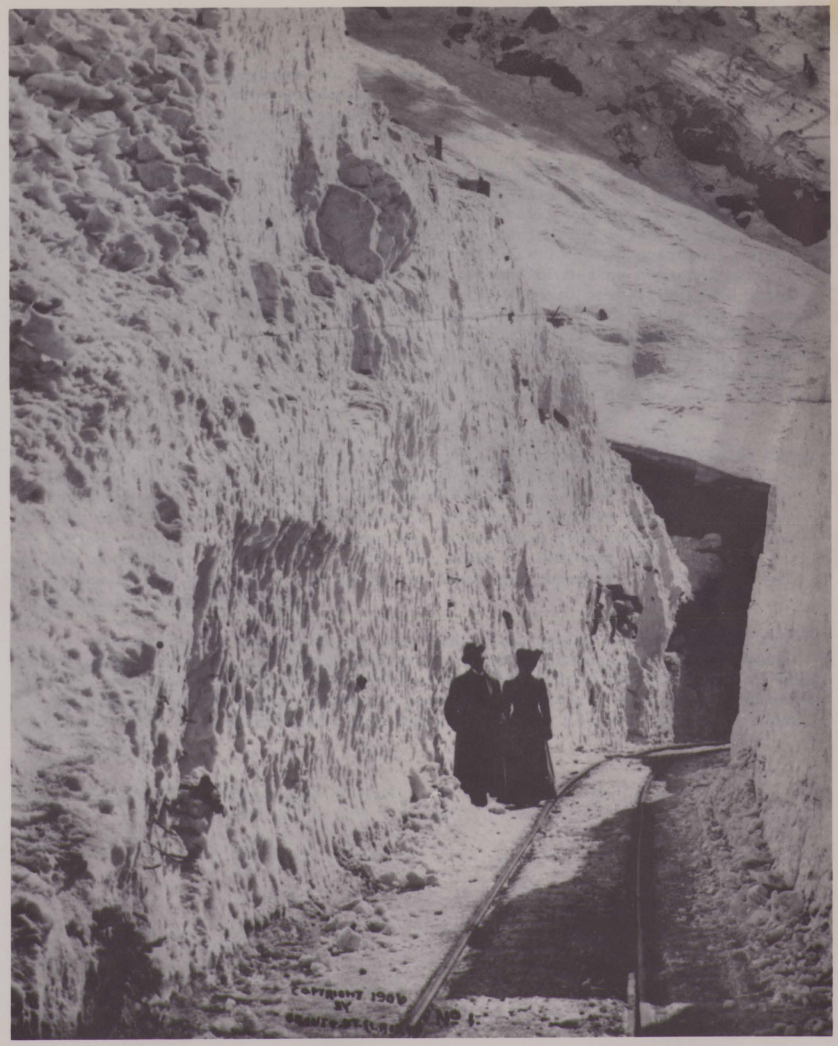
All day a steady snow had drifted down,
Hiding the restful hues of dun and brown
On friendly hill-side, and the slender trail,
That bound us world-ward. Did no spirit quail
At the appaling doom looming before us,
With the unsettled snow-mass trembling o'er us?

(H. L. Wason, 1887: The Slide At The Empire Mine. Letters from Colorado. Cupples and Hurd, Boston, Mass. pp. 154-156).

Cover Photograph:
Green Mountain Mill in Cunningham Gulch. Photograph taken shortly after the avalanche of 17 March 1906. The avalanche removed all the siding from the wall and roof facing the avalanche path and did further damage to the framework of the building. (from the collection of Marvin and Ruth Gregory)

Frontispiece:
Denver and Rio Grande Railroad tracks passing through cut made in avalanche debris, 1906. In the background is the snowshed protecting the tracks. The avalanche debris at this site frequently covered an area greater than that protected by the snowshed, as is shown in this photograph. (from the collection of James Bell)



ABSTRACT

An examination of historical data relating to avalanche activity in San Juan County was undertaken for the period 1875-1975. San Juan County was a booming gold- and silver-producing area, reaching its peak in population, mineral production and, correspondingly, avalanche deaths and destruction to property during the period 1880 through World War I.

Data were obtained from newspapers of the period and by interviews. Avalanche sites were plotted on USGS 1:24,000 scale maps and tabulations of avalanche frequency were developed, chronologically and by geographic location. A total of 95 avalanche deaths were recorded during the survey period. Of these, 69 percent occurred while the victims were in fixed positions, either in or near a building. The remaining 31 percent of deaths occurred while the victims were traveling in the mountains. One hundred properties were damaged by avalanches; of these, 89 were hit between one and three times and 11 were hit four or more times. The location suffering the most damage was the Iowa-Tiger Mill in Arastra Gulch, 2.7 miles due east of Silverton. During a period of 23 years, it was hit on eight occasions, being almost totally destroyed twice. Fifteen geographic locations were plotted where deaths and/or burial from avalanches resulted.

The major avalanche disasters occurred during heavy storm periods, March 1884 and March 1906. During the storm of March 1906, 12 men were killed in the Shenandoah Mine boarding house above Cunningham Gulch, 4.4 miles southeast of Silverton, and six deaths were recorded elsewhere during the storm period. However, avalanche deaths and destruction also occurred during periods of light or no snowfall. After the storm of February 1891, when only 6 inches of new snow fell, one avalanche death was reported and three men were caught but escaped injury.

The avalanche hazard during this historical period was widespread and not concentrated in any particular area primarily because the mining operations were scattered throughout the county with diverse traffic routes. This represents a significant difference from the present-day pattern of avalanche hazard which is concentrated along highways 550 and 110 and within the town of Silverton.

ACKNOWLEDGMENTS

I wish to thank foremost Mr. Bob Wyman, San Juan County Treasurer, who helped me to locate avalanche sites on USGS maps. His memory for places and dates filled in many blanks in the material for this study. Help also came from Mr. Louis Dalla, former Colorado State Highway supervisor in Silverton and San Juan County Commissioner. Through several interviews in his home and on the highways, he described his numerous experiences with San Juan winters. I also wish to acknowledge Mr. Herman Dalla, present San Juan County Commissioner, for his input in verifying incidents and dates. Jim and Marge Bell, lifelong Silverton residents, generously allowed me to use their photographs and provided much useful information; Ruth and Marvin Gregory of Ouray also kindly made their photographic collection available. Standard Metals Company allowed me the use of their enlarged topographic and claims maps to locate several sites. I also thank Richard Armstrong, who provided the detailed information on the geography and snow cover of San Juan County, and Irene Epp, librarian at the Silverton Public Library, who edited the original manuscript.

Thanks go to those who have corresponded with me: Mr. Louis Wyman, Mr. Marion Speer, and Mrs. Helen Watson. A general thank you is due to all those people, residents and former residents of the county, who have worked their memories and squinted at topographic maps to provide valuable data for this study.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

PREFACE

This monograph is based upon historical data culled primarily from the archives of The Silverton Standard newspaper, together with its forerunner The La Plata Miner which was founded in 1875, and from the memories of present and former residents of San Juan County. It is perhaps appropriate that such a study should be published in 1976, Colorado's Centennial Year, since it is a history of avalanche activity and human response to that fearsome phenomenon covering almost identically the period of legal existence of the state. It is intended to serve as a complement to other INSTAAR publications on avalanche phenomena and other natural hazards characteristic of high mountain terrain.

INSTAAR's San Juan Avalanche Research Project was established in 1971 through the award of contract no. 14-06-D-7155 by the Bureau of Reclamation. The original objectives included collection of climatological, snow and direct avalanche occurrence data to form the basis for an avalanche forecast system and to learn more about the potential impact of winter cloud-seeding technology upon degree of avalanche activity. This resulted in establishment of INSTAAR's avalanche research office in Silverton and the development of a team of scientists and observers with Richard L. Armstrong as project leader. Important consultative assistance has been provided by Drs. Edward LaChapelle, Malcolm Mellor and Wilford Weeks, internationally recognized experts in snow and ice and avalanche research. Other related research endeavors gradually accumulated around the Bureau of Reclamation core project. These included, amongst others, studies in snow mechanics and temperature-gradient metamorphism, supported by the United States Army Research Office, Durham (ARO DAHC04-75-G-0028) and experimentation with alternate methods to explosives for avalanche release, funded by Colorado State Highways Department and the Federal Department of Transportation.

A major additional step was the initiation of a continuing research grant from the Office of University Affairs, NASA, for application of remote sensing techniques to the solution of land-use problems in mountainous terrain (NASA-PY NGL-06-003-200). A large element of this effort so far has been devoted to identification of areas subject to avalanche and other natural hazards in specific areas, such as Vail and adjacent land along Gore Creek, Crested Butte, Telluride, and Ophir. More recently particular attention has been given to county-wide natural hazard mapping at a scale of 1:24,000 in San Juan, San Miguel, and Ouray counties. This has been linked to the requirements of Colorado State House Bill 1041 and was initiated by county request and conducted in collaboration with the Colorado Geological Survey.

Knowledge of avalanche activity, including magnitude of specific events and frequency of occurrence on a particular avalanche path, together with understanding of avalanche release mechanisms, is suprisingly limited when it is considered that inadequate response to the hazard causes death and injury, extensive property damage, and disruption of communications. These areas of knowledge must be advanced considerably before an efficient avalanche

forecast system can be made operational and before reliable and effective land-use policies can be developed for mountain lands. The general INSTAAR program in applied mountain geoecology has been based upon the understanding that many avenues of scientific inquiry must be developed and interrelated. The avalanche phenomenon for the land-use planner, for instance, must be broken down into determination of frequency and size of event, extent of the run-out zone, and assessment of impact pressures across the run-out zone, all in relation to man and his property, whether mobile or stationary. This combination of interrelated parameters constitutes, by definition, the avalanche hazard. A closely associated phenomenon is human response to the hazard so defined. Research in the natural sciences required for hazard delineation includes snow mechanics, climatology, meteorology, geomorphology, dendrochronology, botany and vegetation mapping, pedology, remote sensing, and several related fields of knowledge. This is one of the reasons why an interdisciplinary university research institute can provide a good framework for such an undertaking. While the INSTAAR program has attempted to pull these lines of investigation together into an interdisciplinary whole, it was realized at the start that historical data, if available in sufficient magnitude, would provide vital corroborative input. This should be important, not only for testing deductions on avalanche frequency and magnitude, but also for provision of insights into human responses to the avalanche phenomenon itself.

Thus we are fortunate to have Betsy Armstrong as a member of the avalanche research project. She has not only developed an extensive understanding of avalanche and snow processes, but her university training in journalism and history and her enthusiasm for compiling the story of the struggle between man and snow from the earliest days of the San Juan mining settlements, especially fitted her for the painstaking task of reading a hundred years of newspaper files and for extracting the treasures they contain. This built-in capability, however, required the understanding of Allen Nossaman, San Juan County Land-Use Planner, and the personal interests and goodwill of the County Commissioners, before it was appropriately released. Thus the County, through Colorado State House Bill 1041, was able to make a financial contribution to the large task reported here. The balance of the costs were born by the Bureau of Reclamation avalanche research contract and the NASA-PY research grant.

In conclusion a few highlights of the study can be usefully emphasized. The monograph records the first use of dynamite to discharge avalanches in the San Juan Mountains and shows that awareness of the avalanche hazard was sufficiently developed as early as March 1884 to prompt a call for appointment of qualified men with authority to determine location of property so as to reduce the degree of hazard. This is contrasted with reports of incidents where buildings were located in absolutely "safe" sites only to be destroyed a few years later. A remarkable statement relating to a disaster at the Highland Mary Mine should serve to provide a warning to the land-use planner and mountain developer of today:

> "This goes to show that nowhere in the deep gulches of the San Juan can safety be relied upon. The fact that a snowslide has never been known to occur at a particular locality is no guarantee of safety whatever."

This statement dates from 1887 and led to an editorial urging the Colorado legislature to pass a law making it a "penal offense" for mining superintendents to authorize erection of buildings "in dangerous places or where there is a possibility of a slide sweeping them away." This kind of concern culminated in a 7 April 1906 request for a Snowslide Commission under state law and the development of avalanche hazard zoning requirements. It is perhaps not so remarkable that the mountain people had to wait until the passage of House Bill 1041 in 1974 before a start could be made. By this time it was uncontrolled mountain recreational developments rather than mountain mining activities that ensured the response of the necessary political machinery, yet Betsy Armstrong records the first known avalanche death of a Colorado skier on 18 February 1905.

It is hoped that this monograph will not only provide interesting reading for the local antiquarian, but will make a vital contribution to the accumulating data bank on avalanche hazards such that better land-use measures can be taken. A companion study on Ouray County is in progress. Both are designated as contributions to the United States Unesco* Man and the Biosphere (MAB) Program Project 6: Study of the impact of human activities on mountain and tundra ecosystems.

Jack D. Ives
Director, Institute of Arctic and Alpine Research
Chairman, United States MAB Project 6A Directorate
1 April 1976

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*Unesco: United Nations Educational, Scientific and Cultural Organization

CHAPTER I

INTRODUCTION

Physical Geography of San Juan County

San Juan County is located within the southwestern quadrant of Colorado. The total county area is 259,561 acres or approximately 405 square miles. The terrain is predominately mountainous with the average county elevation being 9,400 feet and the elevation range extending from 8,500 to nearly 14,000 feet on some of the mountain summits. The Continental Divide passes through the easternmost quarter of the county. The county contains the headwaters of the Rio Grande, Uncompahgre, Los Pinos and Animas Rivers. The Animas River comprises the primary drainage and runs from north to south through the center of the county. Treeline lies at approximately 12,000 feet, above which the alpine zone is characterized by typical tundra consisting largely of grasses and talus while below treeline, the vegetation is primarily spruce-fir, willow and aspen. Non-vegetated areas in the forest zone are the result of logging in conjunction with mining activities, fires, avalanche activity and talus slopes beneath rock outcrops.

The general climate is one of low relative humidity, abundant sunshine, cool summers with frequent rain showers in July and August, moderate winter snows and wide daily temperature fluctuations. Severe sustained cold waves are rare west of the Continental Divide and stationary high pressure systems frequently control winter weather with warm clear days and cold nights. Precipitation increases and temperature decreases fairly uniformly with elevation. A relatively uniform precipitation regime prevails throughout the year with a maximum in August and a minimum in January. Strong night and early morning temperature inversions are prevalent in valley locations during much of the winter period. Such inversions are usually removed by surface heating and mixing during the day causing valley floor sites to exhibit higher maximum as well as lower minimum temperatures compared to valley wall or ridge top sites.

The San Juan Mountains Winter Snowcover

The winter snowcover of the San Juan Mountains is characterized by relatively light, low density snowfalls; annual accumulations generally amount to depths of 5 to 10 feet with a highly differentiated stratigraphy of very low mechanical strength. This latter condition is primarily the result of two factors. First, the extreme nocturnal radiation cooling occurring on all exposures produces snowpack temperature gradients of a magnitude sufficient to cause significant recrystallization or temperature-gradient metamorphism (depth hoar formation). The second factor is the substantial amount of solar radiation on slopes with a southerly exposure. This daytime condition causes melt just below the surface and subsequent freeze-thaw crusts. These two situations continue to influence the snowcover throughout the winter and the resulting stratigraphy is highly complex.

The snow structure determines the character of the predominant type of avalanche release of which there are two basic forms. The loose snow avalanche initiates from a point where crystals which adhere poorly to each other collect on a slope steeper than their angle of repose. Failure begins near the surface when a small amount of cohesionless snow slips out of place and starts moving downslope and, in turn, sets the snow below in motion. A fan-shaped avalanche is produced, widening from the initial point as more snow becomes incorporated. This type of avalanche primarily involves surface snow only, which limits the volume of snow and thus the magnitude of the event. The fact that loose snow avalanches will often come to rest once the slope angle becomes less steep than that of the release zone, also limits the hazard.

The second type, the slab avalanche, occurs whenever snow lies on a slope in a cohesive layer which is poorly bonded to the snow or ground below. Generally, slabs build as the result of wind-blown snow which, due to the mechanical disturbance by wind, is deposited as a dense, hard layer. Cohesive layers of lesser density may form, even in the absence of wind action, as a result of the deposition of crystal types allowing mechanical interlocking or a close packing ratio. Poor adhesion between layers may be the result of an ice crust, buried surface hoar or the presence of temperature-gradient recrystallization within the snowcover. Slab avalanches release along a fracture line, a sharp division of sliding snow from stable snow, with the face of the fracture being perpendicular to the slope. The entire layer of unstable snow is set in motion simultaneously and the fracture line may extend from tens of feet to over a thousand feet across the slope. The slab itself may vary from only a few inches to over 10 feet in thickness, sometimes incorporating the entire snowcover down to the ground surface. For these reasons, slab avalanches are associated with the movement of large volumes of snow. They are also quite dangerous because the mechanical conditions leading to slab avalanche formation are associated with a large variety of snow structure and crystal types and are consequently difficult to predict. Slab avalanches, like loose snow releases, may involve dry midwinter snow or wet spring snow where the presence of free water, from melt or rain, provides the critical loss in snow strength. Whether dry or wet, slab releases may incorporate only new snow or may be comprised of one or more layers of older snow deposited and metamorphosed prior to the triggering precipitation event. This type of release, referred to as a climax avalanche, comprises 80 to 90 percent of the slab releases in the San Juan Mountains. This condition is a direct result of the complex and highly variable stratigraphy of the local snowcover (Armstrong, et al., 1975; Armstrong and Ives, eds., 1976).

CHAPTER II

GENERAL OVERVIEW AND METHOD OF RESEARCH

Definition of the Hazard

San Juan County's history could be written as a century of struggle against snow. From its earliest development in 1874, then part of La Plata County, its inhabitants have had to deal with winter and its effects for a major portion of each year. An eight-month winter is not considered unusual. With the snow comes avalanches; the avalanche hazard, the degree of danger to people and property from snow avalanches, during the area's hundred years of history is described in this study.

The period 1875-1938 in San Juan County's history was a time of high, widespread avalanche hazard. An extensive transportation system of railroads, aerial tramways, roads and trails was developed to serve the many mines throughout the county. The population was mobile; miners, prospectors, mail carriers and packers traveled year-round and most mines operated year-round whenever possible. Consequently, people and property were exposed to avalanche danger over a large geographic area. High death tolls and frequent destruction to property created an awareness of the avalanche hazard. In 1906, the editor of the Silverton Standard newspaper called for State assistance in establishing an avalanche hazard zoning plan together with appointment of an authorized State officer to carry it out:

> The Standard has a suggestion to offer which it believes will be of great practical good to every mining camp in Colorado. . . Briefly, it is to have a state law enacted by which mining counties may appoint inspectors, or a commission, clothed with the power of protecting, as far as possible, lives and property from snowslides. . . Upon such a commission should the power be bestowed to decide whether sites for such buildings are safe or unsafe, and their licenses issued accordingly. . .[1]

By the late 1930's, mining activity had decreased significantly. In autumn 1938 only one large-scale producer, the Shenandoah-Dives Mine and Mill, continued to operate. The active transportation network was reduced to only the Denver and Rio Grande Railroad from Durango to Silverton, Colorado 110 from Silverton to Howardsville, Cunningham Gulch, and the Million Dollar Highway, or the Durango-Silverton-Ouray Highway, which with improved equipment was kept open year-round except during prolonged storm periods. At this point in the county's history, the avalanche hazard was concentrated along these traffic routes and within the town of Silverton. Avalanche activity noted in the 1940's was mainly located in these areas. In March of 1947, the Silverton Standard noted six slides on Highway 550 after a heavy March storm.[2] The following year, the Standard reported that the Battleship avalanche along Highway 550 had run and ". . . the concussion was so terrific it broke transmission and telephone lines like they were matches strung with thread."[3] Six other slides were reported

down on Highway 550 also. In the Animas Canyon, the Needleton snowslide, which had not run in ten years, was observed covering the railroad tracks.[4]

The avalanche hazard for the period 1951 to the present remains basically the same as it was in the 1930's and 1940's, with a few changes. With the Standard Metals Company opening of the American Tunnel at Gladstone in 1959, Colorado 110 along Cement Creek became another hazard area; after the winter of 1951-1952, the Denver and Rio Grande Railroad restricted its operating schedule to summer months only, practically eliminating the avalanche hazard in the Animas Canyon.

In 1951 the Colorado Highway Department began collecting occurrence data for avalanches affecting U.S. Highway 550, a record that continues to the present. More detailed information became available when the U.S. Forest Service Alpine Snow and Avalanche Project began data collection in this area in 1967. An intensive study of avalanche hazard in the San Juan Mountains began in autumn of 1971 when the Institute of Arctic and Alpine Research (INSTAAR), University of Colorado, under contract to the Bureau of Reclamation, began the San Juan Avalanche Project. Table 1 presents a summary of the 20 most frequently active avalanche paths that affect U.S. Highway 550 from Coal Bank Hill to Red Mountain Pass, using Colorado Highway Department data for 1951-1971 and San Juan Avalanche Project data for 1971-1975. The results of the four-year INSTAAR study, including a chronological tabulation of avalanches observed in the study area (U.S. Highway 550 Coal Bank Hill to Ouray, Colorado 110 Silverton to Gladstone and the town of Silverton) are published separately (Armstrong and Ives, eds., 1976).

In addition, at the request of San Juan County, INSTAAR has prepared an Avalanche Atlas describing each avalanche path monitored within the county. Comprehensive information on the release zone, track and run-out zone, altitude, orientation, slope angle and terrain and vegetation features of each path, as well as a historical record including data from this study, 20 years of Colorado Highway Department data and four years of INSTAAR data, was compiled (Miller, et al., 1976).

During this modern period 1951-1975, the avalanche hazard has been concentrated but not eliminated. Avalanche deaths and destruction occur often enough to remind residents of the hazard. For example, the winter of 1951-1952 renewed the awareness of avalanche danger. On New Year's Day, during a storm which many called the worst since 1932, an avalanche totally destroyed the Highland Mary Mill at the head of Cunningham Gulch, killing the watchman, the sole occupant. At the Pride of the West Mine, also in Cunningham Gulch, the watchman's shack was completely buried by a slide. The watchman could not get out to get coal since the snow had packed in tightly around the doors; he resorted to burning sections of the shack to keep warm until he was rescued several hours later. Silverton was blockaded for six days; the Denver and Rio Grande Railroad tracks and U.S. Highway 550 were blocked by slides. Silverton residents observed the Mt. Kendall, Idaho, Bertramsville, Jennie Parker and Champion slides from town. Eight slides were noted down between Silverton and Gladstone, six on Highway 550, and the Porcupine slide was observed down at the Pride of the West Mill at Howardsville.[5] These areas represent only a small portion of the total area of San Juan County, revealing the concentration of avalanche hazard in the modern period.

TABLE 1

20 MOST FREQUENT AVALANCHE PATHS REACHING HIGHWAY 550
FROM RED MOUNTAIN PASS TO COAL BANK HILL

Colorado Highway Department data 1951-1971				San Juan Avalanche Project data 1971-1975			
avalanche path number	avalanche path name	frequency	average # of events per year	avalanche path number	avalanche path name	frequency	average # of events per year
015-029	Brooklyns	106	5.3	015-029	Brooklyns	57	14.2
104	Eagle	35	1.7	101	Rockwall	24	6.0
144	Champion	30	1.5	104	Eagle	20	5.0
105	Telescope	26	1.3	105	Telescope	12	3.0
101	Rockwall	19	0.9	155	Henry Brown	10	2.5
156	Coal Bank	19	0.9	149	East Lime Creek	9	2.2
010	Cement Fill	17	0.8	144	Champion	8	2.0
154	Swamp	17	0.8	100	Silver Ledge Mine	7	1.7
100	Silver Ledge Mine	15	0.7	142	Peacock	5	1.2
106	Muleshoe	15	0.7	150	West Lime Creek	5	1.2
140-141	Jennie Parker	15	0.7	010	Cement Fill	5	1.2
150	West Lime Creek	11	0.5	140-141	Jennie Parker	5	1.2
157-158	Coal Creek	11	0.5	103	Porcupine	4	1.0
149	East Lime Creek	8	0.4	106	Muleshoe	4	1.0
103	Porcupine	7	0.3	143	Harley Short	4	1.0
142	Peacock	7	0.3	102	Silver Ledge Mill	3	0.7
159-161	Engineer Mountain	7	0.3	157-158	Coal Creek	3	0.7
014	Benny Long	6	0.3	154	Swamp	3	0.7
143	Harley Short	6	0.3	013	Blackburn	3	0.7
030	Cemetery	6	0.3	147	Waterfall	3	0.7

On Sunday, 3 March 1963, on the Ouray County side of Red Mountain Pass, the East Riverside avalanche released onto U.S. Highway 550, killing Reverend Hudson and his two daughters, enroute to conduct services in Silverton.[6] And again, on 2 March 1970, the East Riverside, which had run the day before, killed a Colorado Highway Department employee who was clearing the avalanche debris in a bulldozer.[7] On 17 October 1971 two Texas hunters attempted to cross a gully on Pole Creek Mountain in Hinsdale County which adjoins San Juan County. They released an avalanche which killed one of the men; the other was able to dig himself out.[8]

Sporadic avalanche destruction has kept the residents of San Juan County aware of the hazard but with only minimal economic and population growth during the modern period, the need for any type of avalanche hazard zoning has not been apparent until now. An increase in mining activity, only a possibility a few years ago and now becoming a reality in 1976, and an increase in summer and winter recreational activity and the concurrent interest in building vacation and year-round homes, is activating planning efforts in San Juan County to meet the problems inherent in development. In a pioneering effort, the County Commissioners passed the first avalanche zoning law in the United States in November 1973. This resolution controls land use and building construction in avalanche hazard areas by creating a 3-person avalanche board to review all building permit applications for any proposed building to be located in an area suspected of avalanche danger. The need for such legislation is illustrated by the fact that a few months before the law was enacted, construction began on a mountain cabin located in a large avalanche path. County Land Use Administrator Allan Nossaman has taken the initiative and the responsibility for having the entire county mapped for geologic and avalanche hazard (Bovis and Summer, 1976). In authorizing this historical study, the officials of San Juan County have taken the first step in planning, looking at the past to prepare for the future.

Method of Research

This study was funded by San Juan County with funds from Colorado House Bill 1041 and the U.S. Bureau of Reclamation, Office of Atmospheric Water Resources, for the purpose of locating sites of avalanche occurrence and determining their frequency and magnitude from historical records and personal interviews and correspondence.

> To avoid avalanche-prone sites, you must first be able to recognize them. By far the most reliable way of locating avalanche areas is to study long-term, detailed records of past events.[9]

San Juan County is fortunate in having in the Silverton Public Library an almost complete newspaper record on microfilm, beginning in 1879 with the LaPlata Miner and continuing to the present with The Silverton Standard and the Miner. The La Plata Miner began publication in 1875 but existing copies go back only as far as 1879. Four years of the Animas Forks Pioneer, five months of the Red Mountain City Pilot and nine months of the Red Mountain Review are also on microfilm in the Library.

For the purposes of this study, San Juan County newspapers were examined, covering a period of 59 years from 1879 to 1938. The year 1938 was chosen as a cut-off point because by this date mining activity in San Juan County had been reduced to the operation of only a few mines, a fact which resulted in a significant decrease in activity and traffic in the mountains and a concurrent decrease in the reporting of avalanche activity. The Sunnyside Mill was closed in July 1938 leaving only one active large-scale producer, the Senandoah-Dives Mine and Mill. During the early years of Silverton, often two newspapers were published simultaneously and both papers were read if the occasion warranted. (For a complete list of newspapers examined, see Bibliography, Appendix I.)

Each year of the sample period was read from November through April and the following factors were noted: storm description; absence of storms; avalanche cycles with and without damage to life and property; sites of avalanche occurrence and any data pertaining to the event, i.e. extent of damage, whether the site was considered safe and how long structures had been standing.

The next step was to locate these avalanche sites on USGS 1:24,000 scale maps (see Appendix II). Several of the sites had been mapped already, but the majority were not. With the help of Mr. Bob Wyman, San Juan County Treasurer, and the use of present and former claim maps, it was possible to locate approximately 90 percent of these sites either generally or specifically. A majority of these sites were field checked for accuracy during the summer of 1975. The remainder were unpatented claims that are not located on claim maps, geographic locations or buildings that were so old or whose names were so outdated that those questioned had never heard of them, or sites that were described by the name of the mining company which often changed names, rather than by the name of the claim, which once recorded is never changed.

Historical Overview

The first white men came to what was to be known as San Juan County in the 1860's but it was not until 1873, when the Brunot Treaty was signed with the Ute Indians, that the territory was legally opened for mining and settlement. Silverton was incorporated in 1874 and other settlements, Howardsville, Eureka, Animas Forks, Mineral Point, Chattanooga and Gladstone, began to grow as miners moved into the San Juan Mountains. With the first settlers, came the first recorded avalanche disaster: in the winter of 1874, Moory and Speery's smelter built that autumn at the base of Picayune Mountain (Map 10) was completely demolished and thrown across the Animas River by an avalanche.[10]

Until 1879, most of the traffic traveled over Stony Pass and down Cunningham Gulch (see Figures 1 and 2). In 1879, the wagon road from Silverton to Durango which followed the Animas Canyon, and the road from Silverton up Cement Creek to Poughkeepsie Gulch, were completed. The first railroad, the Denver and Rio Grande, came from Durango to Silverton in July of 1882. The following year, Otto Mears built a toll road from Silverton to Ouray. By 1885, the Mears Transportation Company was hauling freight and passengers up all the gulches of the county where mining activity warranted. In 1886, the Silverton railroad from Silverton to Red Mountain and Ironton Park, a distance of 15 miles, was built. The Silverton Northern Railroad reached Eureka in 1894 and was extended to Animas Forks in 1904, a total distance of 12 miles. The Silverton Gladstone and Northerly Railroad to Gladstone was built in 1905, completing the county railroad network and making all population centers, as well as many of the mines, accessible by railroad.[11]

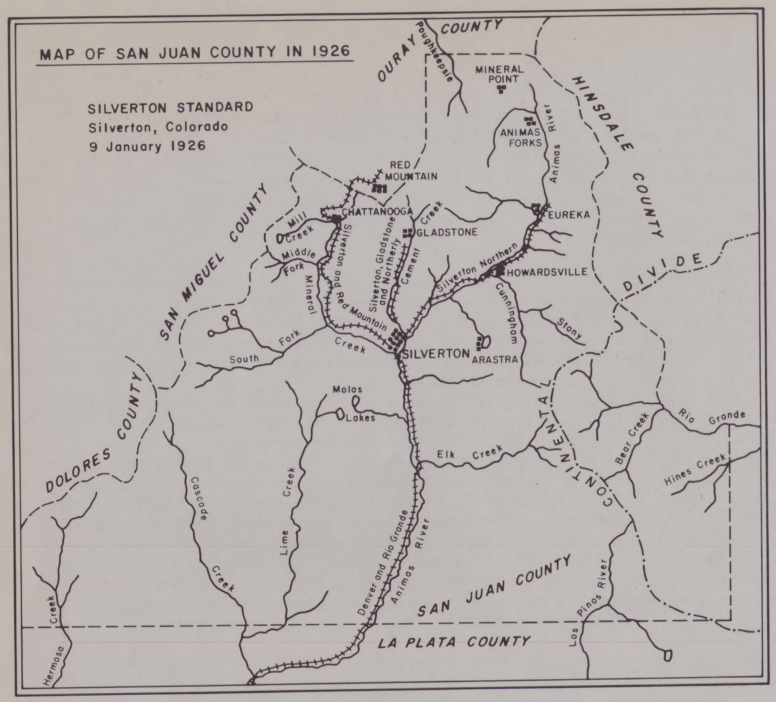

Figure 1. Map of San Juan County in 1926
(Courtesy of the Silverton Standard)

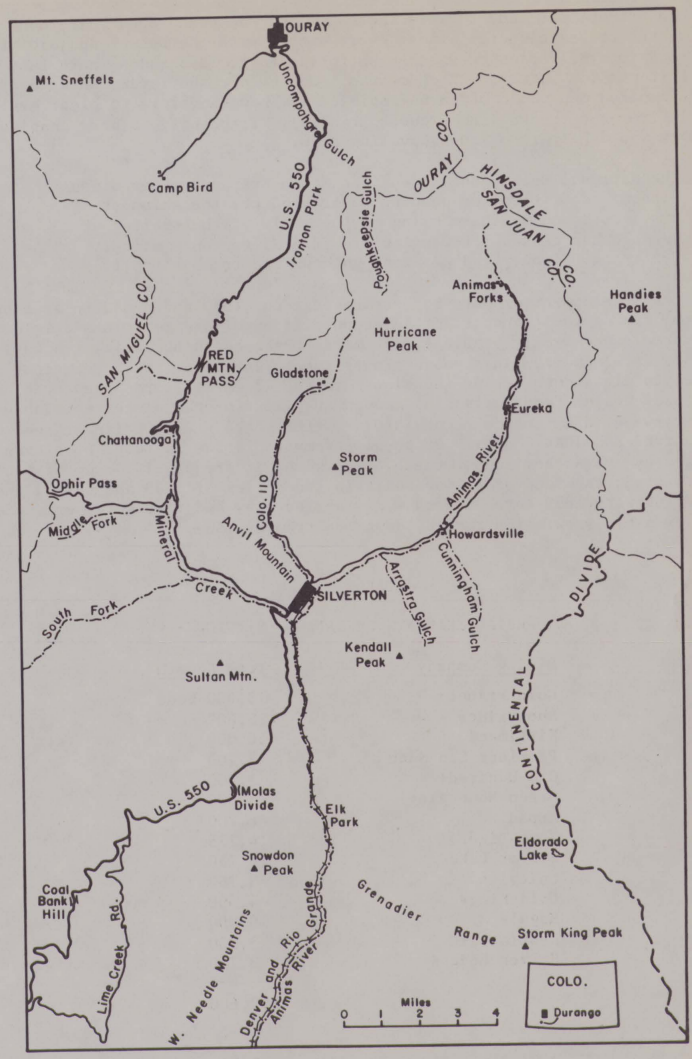

Figure 2. Map of San Juan County, 1975

An attempt was made to keep the roads and railroads open year-round but avalanches caused closures almost every winter with the Denver and Rio Grande Railroad from Silverton to Durango suffering most. Blockades would last anywhere from a few hours to three months[12] and before the rotary snowplow, two to three hundred men would often be employed as snow shovelers to clear avalanche debris from the tracks (see Figures 3 and 4). Frequently, miners unable to get to work would be part of the shoveling crew.

> The National Belle, the Aspen, the North Star and other mines without facilities for dumping their product; the shipment of ore is stopped by the closing of the railway; the smelter at Durango has ceased for want of ore from Silverton's mines... Won't some of our kind citizens go down and tramp a trail.[13]

With the development of more sophisticated technology and a modern transportation system, making the transport of large quantities of ore to points outside the San Juan area economically feasible, the mines began building aerial tramways. Prior to this development, mines above timberline or in inaccessible locations were forced to close down during the winter months if early storms prevented horse or mule pack trains from delivering enough supplies for the winter.[14] Table 2 lists the tramways in existence as of 1910. By this date, 177,600 linear feet of tramway served San Juan County. Of the 14 tramways listed, a total of eleven were damaged by avalanches and of these, five were hit frequently. One of the tramways listed, the Sunnyside, was built in the spring of 1898 and during the week of 10 February 1899 three towers were carried away and five more were knocked down by a big snow slide running down the tramway line.[15]

TABLE 2

AERIAL TRAMWAYS OPERATING IN 1910*

Mining Company	Tram Length
Gold Prince+	13,000 feet
Sunnyside#	15,600
Kittimac+	10,000
Peerless San Juan	3,200
Old Hundred+	3,700
Green Mountain+	3,000
Arpad	6,200
Iowa-Tiger#	14,375
Silver Lake#	13,730
Unity	3,750
Gold King#	4,500
Mogul#	10,000
Henrietta+	5,300
Silver Ledge+	3,750
	177,600

* History of San Juan County, 1910: Colorado School of Mines Quarterly
\+ Suffered avalanche damage
\# Suffered avalanche danger on more than 3 occasions

Although no references to avalanche defense structures were found in the newspapers, this is probably because such structures were built during the summer and this study examined only winter issues of the papers. However, evidence of several defense structures remains in Arastra and Eureka Gulches in the form of triangular wedges which were placed just upslope from the tram tower in order to divert the main force of the avalanche to either side of the structure. These wedges were most often constructed of log cribbings filled with stone, but one example found was built entirely of stone (Figure 5). The latter, higher strength wedge was assembled in the late 1930's by a Tyrolean stone mason and miner after one of the Shenandoah Dives steel towers was wrecked by an avalanche in February 1938.[16] The avalanche struck only the first tower closest to the upper tram station, but four others were pulled down when tower number one was hit.[17] The effectiveness of these wedges varied according to where they were located on a given slope and the size and type of avalanche involved. Another form of defense work was described as simply a large dirt pile built upslope from the Old Hundred Mill (Map 7).[18] It apparently was effective as no record was found of the mill being damaged.

With the steady development of a mining economy, the number of people traveling in the mountains increased accordingly. Packers, railroad employees and mail carriers, as important as the miners to the running of the mines, were constantly exposed to avalanche danger, along with prospectors and miners traveling back and forth between town and the mine for holidays, days off, and dances at the Miners' Hall. When telephones and electric power came into use in the San Juans, a new category was added to the group of people required to travel and work in the mountains. The first reference to the use of the telephone was in March 1890 when the Silverton Standard reported that the telephone wire between the Sunnyside Mill at Eureka and the Sunnyside Extension, later renamed the Gold Prince (Map 11), had been damaged by a snowslide.[19]

A total of 87 deaths from avalanches were recorded during 1879-1938, with an additional eight deaths during the period from 1875-1878. These earliest deaths were referred to in later issues of the newspapers since no papers now exist for that early period. The following table lists deaths and those buried but dug out alive, injured and uninjured. These tallies are from Table 8, a compilation of avalanches involving people, animals, or property in chronological order, found in Appendix III.

TABLE 3

Tallies of Deaths and Those Buried by Avalanches from 1875-1938

	Deaths	Buried, dug out alive	
		Injured	Uninjured
1875-1878 (secondary sources)	8	2	4
1879-1938 (primary sources)	87	19	86
Totals	95	21	90

Figure 3. Cut in Saguache snowslide made to clear the Denver and Rio Grande Railroad tracks of avalanche debris. (Courtesy of the San Juan Historical Society)

Figure 4. Cut in Saguache snowslide made to clear the Denver and Rio Grande Railroad tracks of avalanche debris. (Courtesy of the San Juan Historical Society)

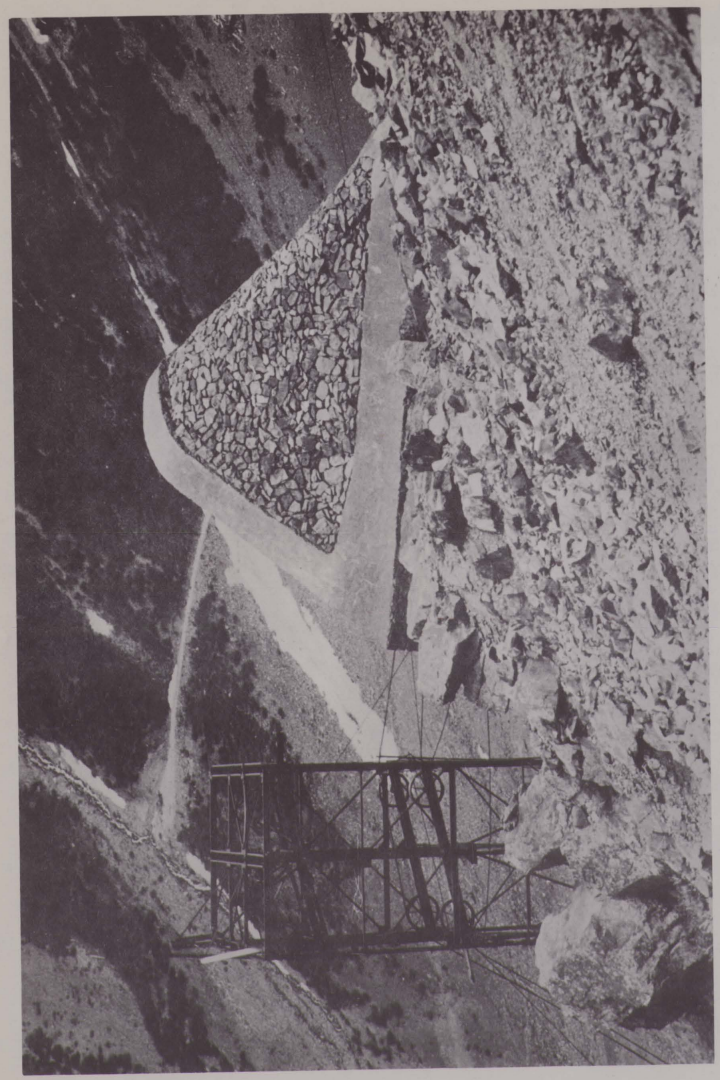

Figure 5. Avalanche defense structure in Arastra Gulch protecting Mayflower tramway. Stone masonry built in 1938. Earlier structures were log cribs filled with stones. The triangular shape of the structure was intended to cause the avalanche to split and flow around the tower located just downslope of the wedge. (R. Armstrong photo)

It is interesting that the totals for deaths and those dug out alive and uninjured are very close, while the number for those injured but still surviving is quite low. Figure 6 breaks down avalanche deaths by month and shows that February and March recorded the highest numbers. The dates given for avalanche occurrences are the newspaper issue dates when they were reported, hence all dates refer to the week preceeding the issue date of the newspaper.

Figures 7 and 8 present the number of deaths from avalanches and the number of incidents involving property damage from avalanches by year for the sample period. Population figures from the United States and Colorado censuses are lower than those quoted in the newspapers of the time, possibly because some mining camps in the county were missed by the census takers.[20] Another possible reason for the lower figures was that many of the residents of the county (17.6 percent[21]) were immigrants, many from non-English speaking countries.

It appears that general climatic trends for the sample period, as reported by Bradley and Barry (1973),[22] generally correlate with the numbers of deaths and property damage from avalanches. In their historical climatology study they reviewed data sources for precipitation variability in southwestern Colorado for the last 100 years.

> Although the data are sparse prior to 1900, a comparison of the general trend of temperature and precipitation for 1850-90 shows an expected inverse relationship . . . Precipitation totals during the late 1850s and early 1860s fell while mean temperatures rose. . . From the late 1860s to approximately 1890, the reverse is true, a cooling trend being paralled by increasing precipitation.
>
> A major low precipitation value occurred around the turn of the century followed by a rapid increase to a peak value in 1908. Precipitation then decreased to a minor low around 1916 followed by an increase to another peak in 1919-22. This minor peak was followed by a drastic fall in precipitation over the next decade to a minimum value for the period at approximately 1929-32. An equally dramatic rise followed, resulting in a peak generally around 1936-38.[23]

The number of avalanche disasters can be related to the degree of mining activity, and it is assumed, the total number of people in the mountains. According to an unpublished master's thesis on the mining history of San Juan County, the county in 1890 was at its peak, with 176 working mines, 1,356 miners employed and 13 mills and concentrators in operation.[24]

The period prior to 1893 was one of slow and steady increases in mining production,[25] which is reflected in the tables as a period of sporadic but continuous avalanche destruction. The county was at its lowest ebb in 1894 because of the silver panic of 1893 causing low prices for silver and basic metals, lead and zinc.[26] This period of reduced activity and perhaps diminished precipitation (few references to storms and avalanche accidents were found in the newspapers for this period) can be seen on Figures 7 and 8,

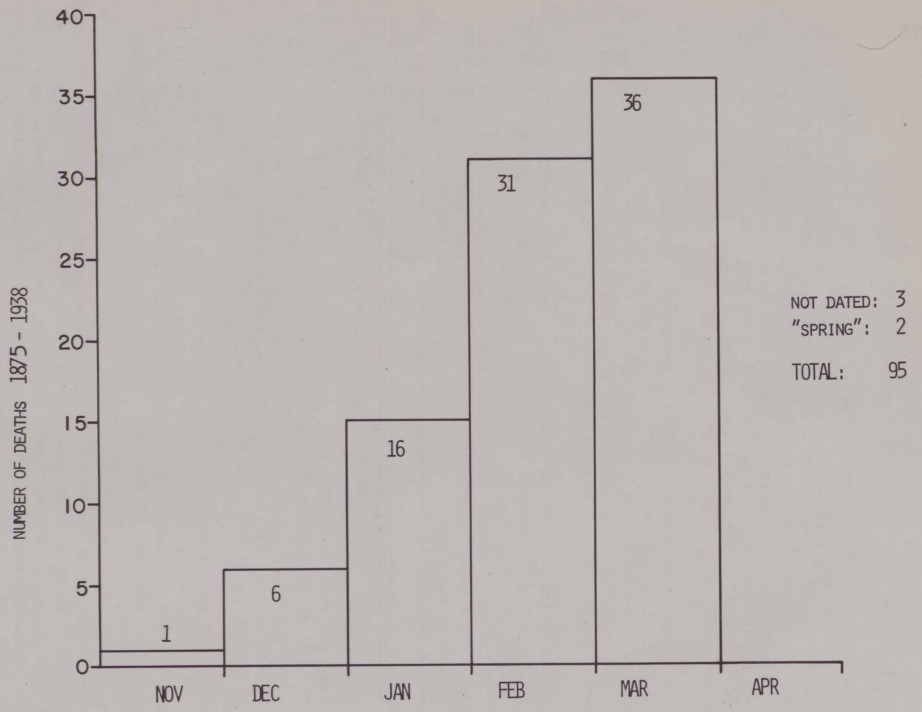

Figure 6. Number of avalanche deaths by month, 1875-1938

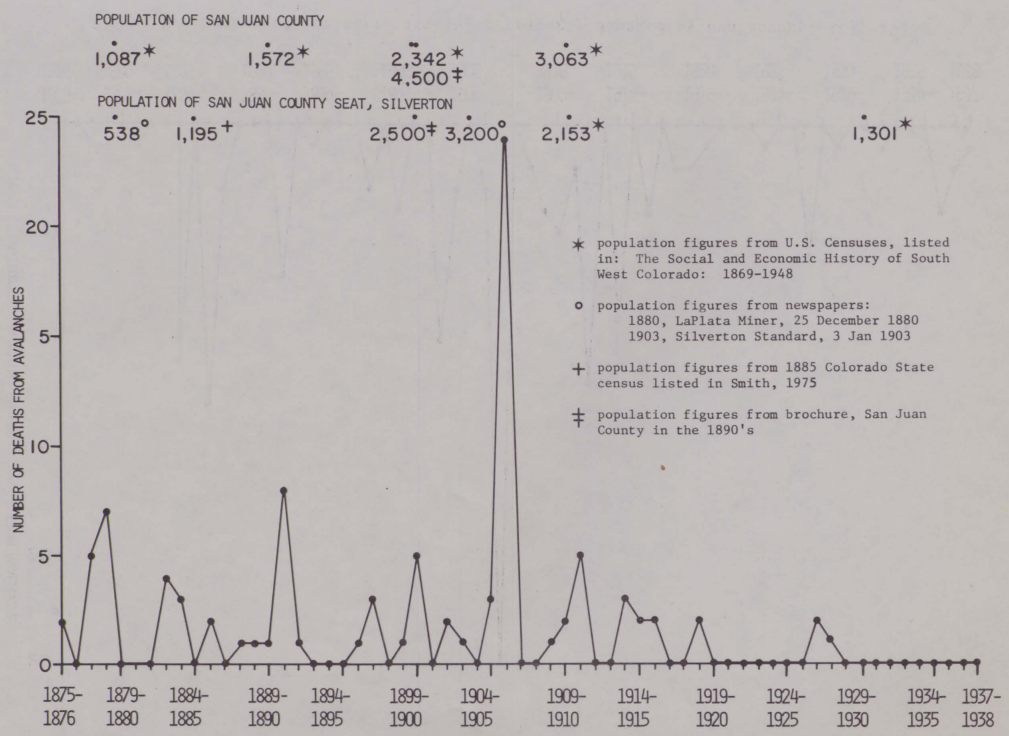

Figure 7. Number of avalanche deaths and population of Silverton and San Juan County by year, 1875-1938

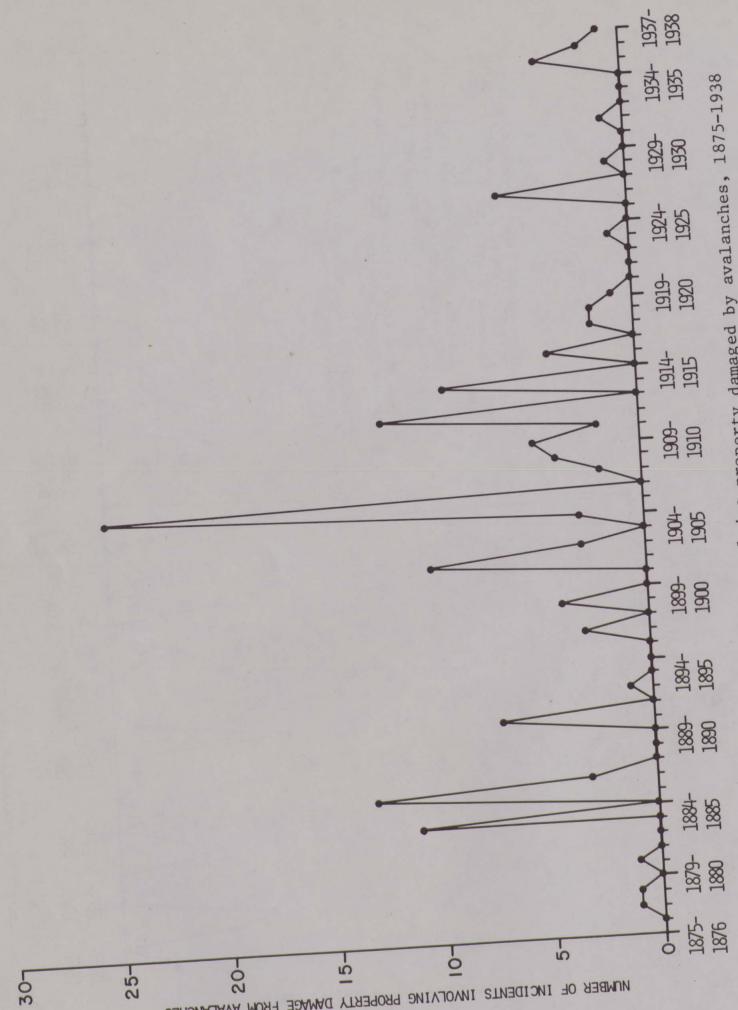

Figure 8. Number of incidents involving property damaged by avalanches, 1875-1938

which reveal only one death and one incident of property damage from avalanche in four winters, 1892-93 - 1895-96. As mining activity began its slow recovery, the numbers of deaths and property damage from avalanches also increased. In 1895, over 1800 men were employed in the county as miners, packers, millmen and prospectors, and four new mills were constructed: the Silver Wing above Eureka, M.E. Harrison at Gladstone, Briggs in the Eureka district, and the Iowa in Arastra Gulch.[27] The Iowa mill thus began its history of encounters with avalanches, eventually holding the record for suffering more damage from avalanches than any other structure in the county. It was hit eight times, suffering almost total destruction twice, and its tramway was damaged four times. The Gold King Mine, later called the American Tunnel, suffered six incidents of avalanche damage. Figure 9 shows the Gold King Mine boarding house in 1906. The mine site was reported damaged by avalanches five times from 1906 to 1916. Figure 10 shows the same site photographed in August 1975. The debris in the gully is presumably the remains of the boarding house and other buildings in that location.

By 1901, when all the old mines which had been idle for years were active once more, the large mines were increasing their capacity and new mines were opening up.[28] The death figures remained fairly low, while figures for property damage were high, with ten incidents and only two deaths reported for the winter of 1901-02. 1902 was another boom year, with the San Juan region producing one half of the entire gold output in Colorado.[29]

The winter of 1905-06 was the heaviest and most destructive on record as seen in Figures 7 and 8 (see Chapter III for a winter summary). In spite of this severe winter and other disasters such as the burning of the Silver Lake Mill and serious damage to the Animas Power Company's plant, the year 1906 had an ore output very close to that of 1905 and was very prosperous.[30] 1907 also saw nearly every mill in the county in operation (14 mills and 17 tramways operating) and much speculation and development of new properties.[31]

In 1908, activity slowed somewhat with the total of working mines numbering 42. The period was characterized as one of steady and conservative progress.[32] After World War I, mining decreased considerably in production and population dropped accordingly, as did the number of avalanche accidents in the county. In 1919, only 26 mines were in operation and ". . .most of these operated only part of the year. . ."[33] In 1924, only nine mines were active[34] and in 1930, 13 mines were active in the Animas Mining District.[35] This steady decline in mining activity and the consequent reduction in people located in hazardous areas is reflected in Figures 7 and 8.

Table 4 illustrates the circumstances of avalanche death during the sample period 1875-1938. The majority of deaths, 66, occurred while people were in fixed positions, either inside a cabin (38 deaths) or working at or near a mine (28 deaths). Frequently, the mine management would close the mine during periods of hazardous conditions: "Danger from snowslides has caused a suspension of work on the Grey Eagle for a few days. The force employed on the mine came to town Wednesday."[36] (Map 5). The 27 March 1897 issue of the Silverton Standard reported that 75 men had come down from the Iowa Mine in Silver Lake Basin (Map 5) that week:

Figure 9. Gold King Mine boarding house, 1906. (Courtesy of the San Juan County Historical Society)

Figure 10. Location of the Gold King Mine boarding house, 1975. (R. Armstrong photo)

TABLE 4

CIRCUMSTANCES OF AVALANCHE DEATHS

1875 - 1938

Circumstances	Number of Deaths	
	Specific Number	Category Total
inside building or cabin		38
working near mine		28
avalanche released by explosion in mine	3	
buried while in mine shaft by avalanche	2	
using dynamite at mine to release avalanche	1	
traveling in mountains		29
skiing	3	
hunting	3	
mail carriers	2	
enroute to avalanche rescue	2	
enroute to funeral of victim caught in avalanche	2	
packer	1	
hauling ore	1	
TOTAL		95

> The heavy snowfall of a day or two prior rendered the locality dangerous, as there's a big slide that occasionally comes crashing down from above the hoisting works. The slide has never killed anyone as yet; the most serious damage that has been done by it was the sweeping away of a small building belonging to Mr. Higgins down into the lake, several hundred feet below.[37]

It was also reported that 12 men remained at the Iowa Mine, packing their blankets into the tunnel.

As described below, the management at some of the mines, like the Pride of the Alps north of Gladstone (Map 3), waited until the first avalanche destruction before closing the mine for the winter.

> The recent heavy snow, owing to the prevailing direction of the wind, had accumulated in very large masses above the mine on Brown's Mountain...The Pride of the Alps vein crosses several gulches and the mine house and blacksmith shop at the upper tunnel are built into the side of the principal gulch on the east side of the mountain. The snowslides come down this gulch after every heavy fall of snow with surprising regularity.[38]

An avalanche released at the moment the three occupants of the Pride of the Alps cabin were speculating on when the slide would run. The men raced into the mine tunnel and within seconds, "...the cabin was filled with a solid mass of snow and the blacksmith shop crushed like an eggshell."[39] This was the second slide to cover the cabin that winter and with five feet of snow on top of the cabin, the mine suspended operations for the winter.[40]

The single reference to a cabin having a trap door leading down into the mine tunnel was described in the LaPlata Miner of 15 February 1879. Nine men were in the cabin at the fourth level of the Highland Mary Mine at the head of Cunningham Gulch (Map 7) when a snowslide passed over and destroyed the cabin. Seven men reached the safety of the tunnel but the remaining two were crushed along with the cabin. Most of the rescuers, who were 500 feet upslope from the cabin and 1000 feet to one side, thought conditions too dangerous to cross the slope between them and the cabin, but three of the men started across and caused another avalanche which killed two and injured the third. This incident is noteworthy also because it is the first mention in the newspapers of using dynamite to set off avalanches: "An effort is to be made today, with giant powder, to start the dangerous drifts that obstruct the trail."[41]

Two examples of explosions setting off avalanches without prior knowledge or planning were found in the newspapers. The first was reported in the La Plata Miner of 3 February 1883 when a snowslide was started by a blast inside the tunnel at the Little Charlie Mine (location unknown), killing one of the two miners waiting outside. Two more miners were killed and one injured at the Sunnyside Mine (Map 10) in March of 1919 when a slide was started by the concussion of the blasting inside the mine.[42]

Another example of disaster occurring near a mine took place in Belcher Basin on Sultan Mountain, one quarter mile above timberline (Map 15). At 5 p.m. on Monday, 16 February 1891, the miners at the Belcher Mine were discussing whether to cross the open slope from the dump to return to the cabin for the night or to go back into the tunnel, go down the winze* and out by the lower level. They decided to risk it and cross over the mine dump. It had been snowing and blowing hard during the day and the storm was one of the heaviest in many years; they had traveled a short distance when a slide came down. Four men were buried; only one was dug out alive. The remaining miners decided to take the bodies to Silverton immediately and the following is a description of the trip:

> The snow in the timber was all ready to slide and on two occasions they had to put giant powder in the snow to shoot it down before they could drag the bodies across. The snow was continually settling with them and they were in imminent danger of starting a slide all the way down. When they got down to the point of timber over the North Star Mill. . .three men dragging one body had just crossed a draw from one point of timber to another when the whole side of the hill below their trail slid.[43]

The three men were safe in the trees and were not caught in the slide. The rest of the men, heeding the warning, did not cross the draw and instead came straight down the hill without further incident.

> This is the worst accident that has happened in this county for eleven years and it is the first life lost upon the Belcher, although the property has been worked for many years.[44]

Residents of San Juan County were not ignorant of the avalanche danger and in only two instances was it reported that structures had been built directly in the path of known avalanche. The first reported incident was described in the LaPlata Miner of 4 March 1877 when the Epley and Brown Smelter located at LaPlata City, one-half mile south of Animas Forks (Map 11), was destroyed by an avalanche. "The works were built right in the track of a snowslide and were the result of Professor Foss, the most successful failure that has ever operated in the country."[45]

> The second incident in March 1884 was of a more serious nature.
>
> During the storm of Monday last, a terrible snowslide occurred in the vicinity of the Sampson and Davenport mines. It started near the top of Bonita Mountain, and, in its downward course, struck the buildings belonging to the Sampson, completely demolishing them, as well as the extensive plant of machinery recently put up by the company to treat the product of the mine. The works consisted of smelters, mill concentrator, tramway and boarding house and stable. These works were entirely new, having been completed last December, at a total cost of over $70,000[46] (Map 3)

Two men were caught in the avalanche; one was recovered bruised but not seriously injured; the body of the other was not found until spring. The article continues:

*A small shaft, often inclined, sunk from one level to another.

> It appears...that the works could have hardly been established in a more dangerous locality, to the destruction of property and life, and presents a phase of ignorance on the part of those locating the buildings, which charity alone prevents us from characterizing as criminal. The location of those works in the path of snowslides against the advice of experienced men conversant with the country, was at the time regarded as an act of folly.
>
> The mine was equipped with the most costly and complete plant of machinery every placed on property in San Juan, and the destruction of life and property thro' careless location, should be obviated hereafter by the employment of men familiar with the country, and whose experience should point the way to proper location.[47]

This quotation was the first mention of employing the advice of people familiar with the mountains in determining the placement of buildings.

Of the avalanche accidents that occurred at or near mine buildings, many were at sites that were considered safe. Eight incidents were reported where cabins and buildings at "safe" sites were destroyed by avalanches (see Table 5). The earliest on record was the Kemp Boys cabin, located in Poughkeepsie Gulch (Map 4). This cabin was "...one of the oldest and considered the safest cabin in Poughkeepsie, but you can't most always sometimes tell about these slides."[48]

The next recorded incident was at the Highland Mary property, already referred to on page 23. An avalanche hit the property on 26 January 1887, crushing all the buildings and "...sweeping them in the form of kindling wood far from their original site."[49] The buildings had been standing about 13 years and had been considered absolutely safe.

> This goes to show that nowhere in the deep gulches of the San Juan can safety be relied on. The fact that a snowslide has never been known to occur in a particular locality is no guarantee of safety whatever.[50]

It was probably the above incident that prompted this editorial in the San Juan issue of 27 January 1887:

> Again, buildings should not be put up where there is the least danger of slides, and we believe that the Colorado Legislature should pass a law making it a penal offense for mining superintendents who have buildings put up in dangerous places or where there is a possibility of a slide sweeping them away. Until such a law is passed, there will be lots of chances taken in the erection of buildings.[51]

This was the first plea for legislation to establish some form of avalanche hazard zoning. A second editorial, printed in the 7 April 1906 edition of the Silverton Standard and titled "A Snowslide Commission" goes into even more detail in suggesting a zoning plan. (The full text of the editorial can be found in Appendix IV.)

TABLE 5

BUILDINGS LOCATED IN "SAFE LOCATIONS"*

Date of Occurrence and Source**	Site and Location	Map No.	Age of Building & Description
13 February 1886 Animas Forks Pioneer	Kemp Boys cabin, Poughkeepsie Gulch+	4	"...one of the oldest and considered the safest cabin in Poughkeepsie..."
29 January 1887 Silverton Democrat	Highland Mary buildings Cunningham Gulch	7	been standing about 13 years, danger of a slide "...never been dreamed of..."
24 February 1888 San Juan	Between Mt. Queen Smelter and Brown's old sawmill near Animas Forks+	11	"It started in a place where there was supposed to be no danger."
6 February 1903 Silverton Weekly Miner	Near Union Tunnel, 1/3 mile from Howardsville	6	"...a recent prospectus issued by the company calls attention to the fact that one of the main objects of the location...was the absence of snowslides there."
24 March 1906 Silverton Standard	Bonner Mine cabin, middle fork of Mineral Creek	12	cabin stood 10 years
24 March 1906 Silverton Standard	Green Mountain Mill Cunningham Gulch	7	"...it was thought impossible for any slide to reach the mill."
31 March 1906 Silverton Standard	Highland Mary stone building	7	stood 30 years
7 March 1908 Silverton Standard	Slaughterhouse & cold storage plant on South Mineral Creek 1 mile from Silverton+	12	It was thought "...safe from every danger of a snowslide as no destructive slide had ever run in the vicinity before but in the matter of snowslides past experience does not always prove to be an infallable guide."

*Listed are only those sites specifically mentioned as being safely located.

**Date listed is newspaper issue date. Actual event date is the week preceding the newspaper date.

+Not mapped, exact location unknown.

> The Standard has a suggestion to offer which it believes will be of great practical good to every mining camp in Colorado... Briefly, it is to have a state law enacted by which mining counties may appoint inspectors, or a commission, clothed with the power of protecting, as far as possible, lives and property from snowslides.
>
> Had a commission composed of practical mining men been consulted the Green Mountain mill would not have been built where it now is and one life and much financially been saved. Had there been inspectors to watch the safety of the working miners perhaps the men would have been called away from the Shenandoah mine before the avalanche swept them to their death. Invested with police powers a commission like this would be a force for good, when great snowfalls load the mountainsides with their freightage of death and devastation.
>
> But these duties would be but incidental to the true object of the commission...There are certain defined places where snowslides run. Statistics, old and new, should be gathered in order that the danger points may be known and avoided as far as possible. It is said conditions change and that slides came down last month where never before. The more reason that an official record should be kept of them, for memory is treacherous.
>
> The Green Mountain management was not the only one to tempt Providence by planting its property in a treacherous place when absolute safety might be had in some other locality nearby. ...Were a commission given plenary powers in the location of such plants, both capital and lives would be guarded by the wisdom of experience...Upon such a commission should the power be bestowed to decide whether sites for such buildings are safe or unsafe, and their licenses issued accordingly...[52]

The Green Mountain Mill (Map 7 and Figure 13) was another structure thought safe. The mill had been installed a few weeks before the storm of 17 March 1906 at a cost of over $200,000. Three hours before the slide came down all but two of the workmen had come to town and the mill had closed down.

> They did not leave the property because of any fear of disaster, as none was anticipated. The mill is situated in a flat, several hundred yards distant from the foot of the mountain and it was thought impossible for any slide to reach the mill.[53]

The assay office, engine room and a considerable portion of the tramway were destroyed; one man was killed and the other narrowly escaped with his life. Another slide the following day "...carried away the boarding house, leaving the great Green Mountain and its extensive improvements a scene of desolation."[54] Final assessment of damages amounted to between $50,000 and $75,000. The storm, the heaviest in San Juan County's history, is discussed in Chapter III.

A final example of a location supposedly safe from avalanche danger was the Union tunnel, located one-third mile from Howardsville at the base of

Tower Mountain (Map 6). An employee of the Big Five Company which owned the Union tunnel, became the first avalanche fatality of the winter of 1902-1903 when:

> While going down the steep hillside to the tunnel, which is only a distance of 75 feet from the top to the railroad grade, and the snow being loose, the slide was easily started which quickly covered and smothered its victim...a recent prospectus issued by the company calls attention to the fact that one of the main objects of the location...was the absence of snow-slides there.[55]

Of the total number of deaths from avalanches during the period 1875-1938, 20 deaths were caused by people starting the slide themselves (Table 6). Only incidents that specifically mentioned or implied the cause of the avalanche were tabulated. A total of 20 incidents fitting this description are noted in Table 6. In 12 of the incidents, deaths were recorded; in the remaining eight all involved survived.

The first reported death of a skier caught in an avalanche in San Juan County was during the winter of 1904-1905. This first fatal snowslide for two winters was reported in the 18 February 1905 issue of the Silverton Standard to have occurred near the Irene Mine above Cement Creek (Figure 11). Two men were trying out their skis on the slope while a third was watching from the mine cabin. An avalanche broke above them, burying them, demolishing the cabin and also burying the observer who was able to dig himself out. The bodies of the two skiers were found several days later four feet apart and 30 feet from where they were hit by the slide.[56]

One of the more tragic avalanche disasters took place at 4:30 p.m. on 17 February 1900. Four men were en route to Gladstone to attend the funeral of a friend who had been killed in an avalanche.

> They started down the mountain to Gladstone and took a short cut through the old workings of the Sampson mine...Just at the mouth of the tunnel and near the old Sampson boarding house an old snowslide track is encountered and the men proceeded to cross over it.[57]

All four were caught by the slide which they released but two managed to escape with their lives while the other two were carried over a steep cliff and killed.[58]

Figure 11. Irene avalanche, Colorado 110 Cement Creek, location of the first avalanche fatality on skis in San Juan County. (R. Armstrong photo)

TABLE 6

AVALANCHES KNOWN TO HAVE BEEN RELEASED BY PEOPLE

Date & Source	Location	Map No.	Description
25 Jan. 1879 LaPlata Miner	Corn Exchange Gulch Mineral Creek	+	4 men started slide, all survived
15 Feb. 1879 LaPlata Miner	Highland Mary Mine	7	3 men started slide, 2 deaths, 1 dug out alive
3 Feb. 1883 LaPlata Miner	Little Charlie Mine	+	2 men enroute to avalanche rescue started slide, both survived
14 Jan. 1888 Silverton Democrat	Buckeye Mine	7	4 men excavating snow from around building started slide, all survived
18 Feb. 1888 Silverton Democrat	30 feet from North Star Mine, King Solomon Mt.	7	1 man missed guide rope stretched across draw, slipped and started slide, died hours after he was dug out alive
4 Jan. 1890 Silverton Standard	Whale Mine	5	5 men coming down from mine started slide, all survived
7 Feb. 1891 Silverton Standard	3/4 mi. on summer trail from North Star Mine, King Solomon Mt.	7	Two men started slide, 1 death, 1 jumped clear of slide
21 Feb. 1891 Silverton Standard	Belcher Mine	15	4 men caught crossing slope, 3 deaths, 1 dug out alive
15 Jan. 1897 Silverton Weekly Miner	Draw between Hudson and Congress Mines+	13	2 women traveling in sled both buried, 1 death, 1 uninjured
23 Feb. 1900 Silverton Weekly Miner	Sampson Mine	3	4 men enroute to funeral of snowslide victim started slide 2 deaths, 2 escaped
11 Jan. 1901 Silverton Weekly Miner	Hematite Gulch	6	1 man inspecting his claim was caught, dug himself out

+ Not mapped, exact location unknown

Date & Source	Location	Map No.	Description
6 Feb. 1903 Silverton Weekly Miner	Union Tunnel	6	1 man started slide, died
29 Jan. 1904 Silverton Weekly Miner	Near Bonita Mt.	3	2 men started slide, both survived
24 Dec. 1904 Silverton Standard	Near North Star Mine King Solomon Mt.	7	1 man started slide, grabbed rocks and saved himself
18 Feb. 1905 Silverton Standard	Near Irene Mine	2	2 men on skis started slide, both died
13 Dec. 1913 Silverton Standard	3/4 mi. Silverton side of Buffalo Boy Mine	7	2 men on skis started slide, 1 death, 1 not caught
27 Feb. 1915 Silverton Standard	Near Champion Mine	15	1 man started slide, died
1 Jan. 1916 Silverton Standard	Dawn of Day Slide Dry Gulch	3	1 man started slide, survived
8 Jan. 1916 Silverton Standard	Head of Rien Gulch	7	2 men had already crossed the gulch, husband and wife crossing when slide broke, both caught, 2 deaths
26 Feb. 1927 Silverton Standard	Near Sunnyside Mine	10	2 men started slide, both died

CHAPTER III

CASE STUDIES

In this section, six sample winters of varying intensity will be examined in detail in order to augment the more general overview of the San Juan winter climate and its effect on people and property. For specific, year-by-year references to avalanche damage during the period 1875-1938, Table 8 lists avalanche incidents involving people, animals and property in chronological order, while Table 9 geographically lists historic sites of avalanche occurrences and their frequency. Table 10 is a compilation of weather descriptions and theories of weather and avalanche forecasting in chronological order, 1879-1938. These tables are located in Appendix III. Because of the sketchiness of the climatic data for much of the sample period, there was no attempt made to classify winters as light or heavy or to correlate the intensity of the winter with numbers of avalanche incidents, except when the data were deemed sufficient to do so.

1883-1884

In the decade of the 1880's, 12 people lost their lives and 31 locations incurred property damaged by avalanches (Table 8). The most destructive winter appears to be that of 1883-84. Heavy snow came early in the winter of 1883-84 as evidenced by a report in the LaPlata Miner of 15 December 1883 that snowfall was so heavy at the Congress Mine south of Red Mountain (Map 13), that the roof of the Haines hotel collapsed from the weight of the snow.[59] In that same issue, the first fatality of the season was reported: three men "...who were packing grub to the mines were caught in a small slide in close proximity to the Silver Crown mine."[60] (Map 12). One was killed, the other two slightly injured.

> Winter began in earnest towards the end of December.
>
> One of the most terrible and persistent snow storms that has ever visited the San Juan country within the recollection of the oldest inhabitant or white settler, commenced on Tuesday the 19th inst. and continued without intermission until Wednesday the 26th, lasting nine days.[61]

Five feet of new snow accumulated at Red Mountain Town in Ouray County and snowfall was general throughout the state with all communications destroyed.[62] However, the storm produced no destructive avalanches in San Juan County as there was no mention of property damage or lives lost. A lull in January preceeded the February storms. Snow started Sunday, 3 February, and continued intermittently through Friday with gale-force winds, drifts up to seven feet high and about three feet of snow reported on the ground in Silverton.[63] The Animas Forks Pioneer reported that town to be snowed in (Map 11) with five feet of new snow and "snowslides innumberable from all points".[64] Avalanche

incidents were reported throughout February. The Jennie Parker ore house (Map 15) was swept away by a slide.[65] A cabin in Ice Lake Basin was struck by a slide demolishing the cabin and burying the two inhabitants who managed to dig themselves out.[66] One man was buried while timbering a shaft just above the Mineral King Mine in Prospect Basin (Map 3), but was able to dig himself out,[67] and a huge avalanche was reported to have swept away the stable and cookhouse of the Eclipse smelter at the base of Grouse Gulch (Map 9), coming right to the office door.[68] Seven snowslides were reported down between Animas Forks and Eureka that week.[69]

By March 1, four times as much snow as in any previous winter was reported at Animas Forks, with many one-story buildings covered, snowdrifts in some places up to 70 feet deep and no end to the snow in sight.[70] The following week, seventy-five slides were reported down between Animas Forks and Eureka, with one running within 150 feet of the newspaper office in Animas Forks. A slide which stopped 200 yards from town started two-thirds of the way up Wood Mountain and was observed to be over a half-mile wide.[71]

> At the foot of the mountain is a canyon 100 feet deep, which the slide filled up and then, running on, struck the shaft house of the Columbus Mine.[72]

The Eclipse smelter was struck again by the same slide which had hit it two weeks before,[73] the San Juan Herald reported damage to the Green Mountain and Pride of the West mine buildings (Map 7) and extensive damage to the Sampson Mine[74] (see page 24 of this report). The Animas Forks Pioneer of 15 March summed up the situation: "Since the last storm, a reign of terror has spread over all this part of the country, such as was never known before." Sixteen feet of snow was measured at the Forks with "...everything in a very dangerous condition."[75] Chattanooga (Map 12) was visited by an avalanche from Independence Mountain northwest of town, which demolished four buildings as it ran down the main street to the center of town. At Neigoldstown in Cunningham Gulch (Map 7), a snowslide took away the mill, two cabins and Mr. Schoelkopf's dwelling "...in which was a fine piano...", destroying everything totally.[76]

> And a snowslide down Monday is the largest of the season, being at least 1000 feet deep. After crossing the Animas River near the Eclipse smelter, it ran part way up the other mountain, then folded over and fell back like an immense wave.[77]

California and Mastadon (Placer) gulches were buried 75 feet deep with snow, the mountain being one continuous slide the entire distance up to the Mountain Queen Mine (Map 11).[78]

The Denver and Rio Grande Railroad was blockaded from early February until April, and until the tracks were cleared Silverton citizens on snowshoes hauled supplies on toboggans the 18 miles from Needleton into town.[79]

This was a disastrous winter for the entire state. The Animas Forks Pioneer quoted the following from the Denver Republican: "It is believed that more than a hundred men have lost their lives in snowslides in the mountains of Colorado this winter."[80]

1890-1891

Although there were only a few storms, eight fatalities were reported for the winter of 1890-91. On 6 December, more snow was in Silverton than in the hills[81] and on 20 December, trails to the North Star on King Solomon Mountain and the Silver Lake mines were still open and there was very little snow.[82] This pattern continued. The Silverton Standard on 10 January described the winter as being light so far with very little snow and noted that Mr. Louis Wyman recently packed 30 burros from the North Star, Solomon, down the summer trail over the hog back.[83]

When it finally snowed again, the event was received favorably: "The snow this week came as a blessing. The main street was bare and it was impossible to get sleighs up town."[84] However, news of its effects soon began filtering into town. A miraculous escape from a slide at the North Star, Solomon, on Tuesday, 3 February, was reported 7 February. Two men who were shoveling the trail about 50 feet from the mine dump observed a slide; one ran to safety in the tunnel and the other laid himself flat on the trail. A rock on the upper side of the trail protected him and the slide passed over him and into Dives Basin. Not so fortunate was D. W. Wilson who died in a snowslide Thursday evening, 5 February. Wilson and his partner, Burnett, had been packing out ore with eight mules from the North Star, Solomon, and had already made several trips, encountering no problems with the six inches of new snow on the trail. Late in the afternoon they started down from the hog back with Wilson behind Burnett; about three-quarters of a mile from the mine, a mule walked off the trail. After the mule had made three or four plunges in attempting to get back on the trail, Burnett heard the snow settle and jumped ahead to a small bare knoll. Wilson, who was behind on the trail was buried by the slide.[85] Burnett had never known the snow so treacherous:

> There was but about six inches of new snow and he thought they were perfectly safe. He accounts for so many slides within the past few days to the fact that the warm winds rotted the old snow and it is all granulated as it is in the spring, and would not hold the new snow. The slide was a quarter of a mile long, from 50 to 100 feet wide and from 20 to 50 feet deep.[86]

The snow described as granulated was most likely temperature-gradient snow, discussed in the introduction. In the same issue of the Standard, a storm of greater magnitude at Red Mountain than in Silverton was noted and it was observed that Silverton residents "...still have the springtime season we have enjoyed all winter" although slides were running all through the county.[87]

The following week brought another storm which ended 20 February and was described as the heaviest of the winter with two or three feet of new snow and high winds.

> The old snow was granulated and had a light crust on it, and when a little of the new snow had fallen it commenced sliding in all directions.[88]

The aftermath of this storm, as reported in the 21 February issue of the Standard, brought three deaths at the Belcher Mine on Sultan Mountain (see Chapter II, page 24); two men killed in the Old Lout bunkhouse (Map 4) when a small slide pushed the building against a tree; two men buried in their cabin under ten feet of snow at the Porcupine Mine, Cement Creek (Map 2) who dug themselves out and decided to come to town as there was "...a large quantity of snow above them" still. The King Lead boarding house (Map 6) was hit by a slide which carried away the end and side of the building, leaving unhurt the two occupants in bed at the other end of the house. At the Titusville mill bunkhouse where two men were sleeping (Map 5), a slide "...tore off the end of the kitchen and filled what was left full of snow" without injury to the men. Telegraph wires were down between Silverton and Durango and Red Mountain and ten large slides were down in the Animas Canyon between Silverton and Elk Park, blockading the Denver and Rio Grande Railroad.[89]

It appears that once the avalanches began, they did not end until April. Slides were reported again in the 28 February issue of the Standard. Ross Basin above Cement Creek was filled with avalanche debris from all directions; the Caucasus Mine (Map 4) was covered with 50 feet of snow by a slide from Hurricane Peak and "...everything in the county that could slide has done so."[90]

The old Green Mountain concentrator at Howardsville (exact location unknown) was demolished by an avalanche which was estimated to be 1500 feet wide, and at Eureka a slide took off a corner of the Imodene Mill and carried White and Tallman's powder house (exact locations unknown) to about 300 feet above the mill. The Idaho Gulch avalanche on Kendall Mountain (Map 1) swept over the dump of the Idaho Mine, taking with it an iron car, and "...ran across the park to a level with Blair Street. It took out one telegraph pole and covered up the Y with about ten feet of snow. This is the furthest it has run since 1879."[91] Near the Congress Mine a man and his four-horse wagon were covered by a small slide but were dug out uninjured.[92] On March 7 the Standard reported one man "...covered to his ears..." by a slide in Mastadon (Placer) Gulch who managed to wiggle out, and the first mail from the west since February 14 was delivered to Silverton. Durango was in worse shape than Silverton. Both towns were blockaded, several of the snow sheds on the Conejos line were broken down and more snow was reported south of Durango and between Durango and Cascade than in Silverton, with four feet on the level at Rockwood.[93]

> If you want to see some very fine weather come to the San Juan country - in the summer.[94]

> The snowslides have been simply fearful, nothing of the kind has been seen for the last 12 years. The oldest timer in this district never saw anything of the kind.[95]

The railroad blockade was finally lifted on 11 April, after 53 days; one of the larger slides cleared was 48 feet deep.[96]

1905-1906

This winter, the most destructive to life and property in San Juan County's history, began with a storm November 26-27 which "...was fully equal in severity to any of last winter...,"[97] with two feet in Silverton and more in the mountains and high winds. No more activity was reported until the Silverton Standard on 27 January announced a blockade which began January 18 and would not end until the end of the month, with the headlines "Silverton Closed to the World."[98]

> The snow fell fiercely and continuously for three days, then a howling gale eddied it into tremendous drifts that paralyzed traffic and shut this region in from the world outside and the outlying camps from this city, their supply point.[99]

Five workers were killed at the Terry Tunnel (Map 10) of the Sunnyside Mine while working on the dump.

> The men were engaged in shoveling the snow from the cut at the entrance to the tunnel and two others...were fixing the telephone line in the hill above. In some manner these men loosened a small quantity of snow which rolled down on the laborers in the cut, crushing them to the ground. It is said that there was not enough snow that slid to fill an ordinary sized room.[100]

Property damage from avalanches was extensive. The Sunnyside lost six towers of its tramway, the Iowa-Tiger Mine in Arastra Basin (Silver Lake Basin, Map 5), lost two tram towers, ore bins and the blacksmith shop, and the Old Hundred tramway (Map 7) which had been built that fall, lost one tower and a portion of another.[101] The Natalie and Occidental Mining Company above Gladstone (Map 3) lost its boarding house, office and compressor room, with a total of $5,000 damage, and the unfortunate Iowa Mill was "...crushed to the table floor by an immense snowslide which came down the side of the Little Giant Mountain. The mill was preparing for an active season and the loss will be severely felt by all."[102] The Green Mountain Mine (Map 7) was also damaged with several tramway towers swept away and other losses sustained.[103] As residents recovered from this storm, which was then thought to be the worst of the winter, they never expected what was to follow in less than two months.

The storm began Sunday morning, 11 March 1906. Before that date, spring-like weather had prevailed with general thawing and bare streets.[104] A thaw during the week of 24 February had melted the snow sufficiently to open some of the trails.[105] A small storm on 3 March and then another thaw set the scene for this destructive storm.[106] The snow continued until Wednesday, 14 March,

> ...when the sun broke through the clouds and promise of fair weather beamed forth. But only for a little time. Gathering new force, the storm king came back to the attack Wednesday night and has held undisputed sway ever since.[107]

Along with the snow, a "strong wind has raged which has filled the cuts and canons and drifted the snow to the eaves...About the streets the snow lies from one to two feet..."[108] The Silverton snowplow, a wedge usually pulled by two horses, was used in an attempt to clear the walks but "...with unsatisfactory results. The snow has melted and packed along the sidewalks, and against such a combination the plow can do little."[109]

It appears that the storm came from the south since mention is made of Ouray missing the brunt of the storm with Durango having its troubles along with Silverton. The passenger train which left Silverton got as far as Chama, New Mexico "...and there it is yet, as Cumbres (pass) is piled high with snow."[110] Only a few slides were reported in the 17 March issue of the Silverton Standard, except in the lower Animas Canyon. Thirty slides were reported down between Silverton and Elk Park along the Denver and Rio Grande Railroad tracks and were said to be "packed in like solid ice."[111]

A small slide on Tuesday the 13th hit the Mogul mill at Gladstone, and on Thursday a slide swept away one of the Mogul's tramway towers. At noon on Thursday, the first big slide of the storm occurred in Silverton. The Mt. Kendall slide "with a rush and a roar plowed a course for almost two miles, beginning near the towering summit and ending in the bed of the river which courses through town," destroying three unoccupied cabins in the process.[112]

> Kendall is in the habit each winter of dropping a few tons of snow into town along the trail of Thursday's descent. This year's visitation, however, is said to be in the nature of a record breaker.[113]

The debris piled up on the Silverton Northern's tracks near the crossing of Cement Creek.[114]

> On Thursday night, a huge snowslide on Galena Mt. near the Old Hundred Mine, crushed in the rear end of the residence of D. Ritter in Cunningham Gulch. Fortunately the inmates escaped injury, although badly frightened.[115] (Figure 12)

The magnitude of the storm soon became apparent, as seen in this headline of the 24 March Silverton Standard.

> Desolation & Death. The 17th of March a Date Long to Be Remembered in This District - Storm Reaches Its Climax St. Patrick's Night and Almost a Score of Lives Lost.[116]

The 24 March edition of the Silverton Standard and the 23 March issue of the Silverton Weekly Miner reported the bulk of the destruction.

> After a week of unbroken storm, Monday dawned clear and warm and the deep snow began melting rapidly. With the lifting of the storm reports of disaster began coming in thick and fast. The brunt of the bad news came from Cunningham Gulch, which for almost four miles of its length is an unbroken series of slides and in places the gulch is buried under snow 150 feet deep.[117]

Figure 12. Residence of D. Ritter, near the Old Hundred Mine, crushed by an avalanche from Galena Mountain, 17 March 1906. (from the collection of James Bell)

TABLE 7

AVALANCHE DESTRUCTION - STORM OF 17 MARCH 1906*

Date	Day	Time	Event
March 13	Tues	pm	Mogul mill, small slide
15	Thurs	noon	Mt. Kendall, crossed Animas River and ran almost to Cement Creek, destroyed 3 unoccupied cabins
15	Thurs	pm	Mogul tramway, 1 tower swept away
15	Thurs	pm	residence near Old Hundred Mine crushed, no injuries
16	Fri	1630	Unity Tunnel boarding house destroyed, 1 injured Last Chance boarding house hit, 1 death, 1 injured Mrs. Johnson's cabin, 1 injured
17	Sat	noon	New Green Mt. mill, $50,000 damage, assay office, engine room & upper portion mill destroyed, 1 death, 1 injured
17	Sat	1830	Shenandoah bunk & boarding house destroyed, 21 in building, 12 deaths
17	Sat	2300	Bonner Mine cabin crushed, 2 deaths
17	Sat	pm	Notaway Mine buildings crushed
17	Sat	pm	Silver Wing boarding house destroyed, 1 death 1 injured
17	Sat	pm	Sunlight bunkhouse crushed, 1 death, 1 injured
17	Sat	pm	Mountain Queen compressor taken out, no injuries
17	Sat	--	Iowa Mill partially destroyed (thousands of dollars damage)
18	Sun	am	North Star Gulch, crossed creek, destroyed powder-house on Anvil mountain
18	Sun	1400	Highland Mary Mill partially destroyed, 2 occupants survived
18	Sun	pm	Thunder tunnel, upper workings swept away
18	Sun	pm	House destroyed near Silver Lake tramway midway terminal, 1 occupant survived
--			Anglo-Saxon Mine bunk house swept away
--			Big Colorado Mine buildings swept away
--			Esmeralda Mine power & compressor house and all buildings swept away

* Silverton Standard, 17 March and 24 March 1906; Silverton Weekly Miner, 23 March 1906.

Most of the avalanches occurred Friday, Saturday and Sunday, 16-18 March (see Table 7). Friday at 4:30 p.m., two boarding houses in Arastra Gulch, the Unity and the Last Chance, were swept away by the same slide. At the Unity, the bakery department, the dining room and part of the blacksmith shop were carried to the bottom of Arastra Gulch. The baker's leg was broken and several other people narrowly escaped injury. About 70 men were employed at the Unity and had the slide occurred during shift change, about an hour later, those men would have been in the dining room and swept away by the slide. The slide continued 300 feet to the Last Chance where five Italian miners were in the bunkhouse. It struck the bunkhouse and buried all five, killing one and seriously injuring another. And it was not yet spent:

> Below the Last Chance the slide struck the cabin occupied by Mrs. Johnson, near the bottom of Arastra Gulch, and after turning it upside down several times, landed her safely, with only a bad shaking, several hundred feet from the starting point. Her husband...is confined to his rooms here from severe injuries by the slide.[118]

Saturday at noon the Green Mountain Mill in Cunningham Gulch was hit by a slide and partially destroyed with an estimated $50,000 worth of damage, one man killed and another injured (see Chapter II, page 27).[119] The cover photograph shows the mill shortly after it was damaged.

The greatest disaster of the storm occurred at 6:30 Saturday night when the Spotted Pup boarding house of the Shenandoah Mine, located in the Shenandoah-Dives Basin above Cunningham Gulch (Map 7), was hit by an avalanche. The slide started from the summit of the mountain, 200 feet above the Shenandoah property, and ran to the bottom of Cunningham Gulch.[120] One survivor observed two slides, one on each side of the basin.[121] Twenty-one men were in the boarding house eating dinner when the slide hit; only nine survived. In correspondence with Marion Speer, one of the rescuers, he remembers that debris from the slide had crossed the gulch and gone part-way up the other side.[122] Part of the rescue party is pictured in Figure 13. An account of the experience by one of the survivors, S. F. Nelson, was printed in the 31 March issue of the Silverton Standard:

> "The slide struck the bunkhouse containing the entire force of twenty-one men, at 6:30 on the evening of the 17th of March. The bunkhouse has two rooms. I was in the front room when the slide struck us.
>
> It struck the front of the house first and I think I flopped about a dozen sumersaults. It lifted the bunkhouse up, smashed it into kindling wood and we were all thrown out into the slide at one time.
>
> The slide had a kind of a rolling motion, and we were all swept along, first on top and then underneath, and when the slide stopped I was one fortunate enough to be on top, with only my head and arms projecting. I felt happy to find I could breathe and I at once proceeded to dig myself out with my hands.

> It took only a minute to extricate myself. In rolling along with the slide I was mixed up with sugar sacks, cracker boxes, ginger snaps, and clothing generally. As soon as I was free I stood up and shouted, 'Glory to God!'
>
> Looking around I saw a hand projecting through the snow and I commenced digging its owner out. It was Kid Teague. It took only a short time to pull him out, and he said "There is a man under me." So I began digging again and soon found Joe Bradshaw. I caught him by the arm, pulled as I never pulled before and succeeded in getting him out alive.
>
> Ed Fiance who like myself came out on top, found Bill Hall and Bennett and dug the snow from about their faces so they could breathe. I then secured a shovel and dug them out.
>
> Shorty Gould and Frank Vercellio were also thrown out. Geo. Hill was carried over a cliff below where the bunkhouse stood, about twenty or thirty feet high. He was badly bruised and dazed and wandered about in the snow all night. In the morning he was discovered by Bill Hall. His hand was badly cut and frozen.
>
> After we were out of the slide we went into the engine room of the mine and wrapped ourselves in burlap and kept moving to keep warm. In the morning we went out into the ore house, built a fire in the stove and cooked some grub that was kept in the mine on a shovel and that was our breakfast.
>
> I was badly bruised, my hands frozen from digging in the snow, and I cannot realize how it was that I kept up at all, unless it was the excitement and my desire to do all I could for my fellow workmen and companions."[123]

In all, Saturday evening produced 16 deaths at six locations. The Silver Wing boarding house which had stood for about 20 years was destroyed that night, killing one miner and injuring another, the sole occupants of the building (Map 9). The Bonner mine cabin (Map 12) which had stood approximately 10 years was also destroyed and its two occupants crushed to death. This cabin was thought to be in a safe place as no slide had been observed to run there before.[124]

At the Sunlight bunkhouse in Placer (Mastadon) Gulch near Animas Forks, Joseph Walker, the watchman from the Sound Democrat, was killed in an avalanche which began near the Gold Prince Mine (Map 11) and covered the compressor house and tunnel, imprisoning several men inside. Walker had gone to the Sunlight bunkhouse thinking it was safer there. When the slide struck, he was asleep with William Malone on the upper floor of the bunkhouse.

Figure 13. Rescue party starting out towards the Shenandoah Mine boarding house avalanche disaster of 17 March 1906. (from the collection of James Bell)

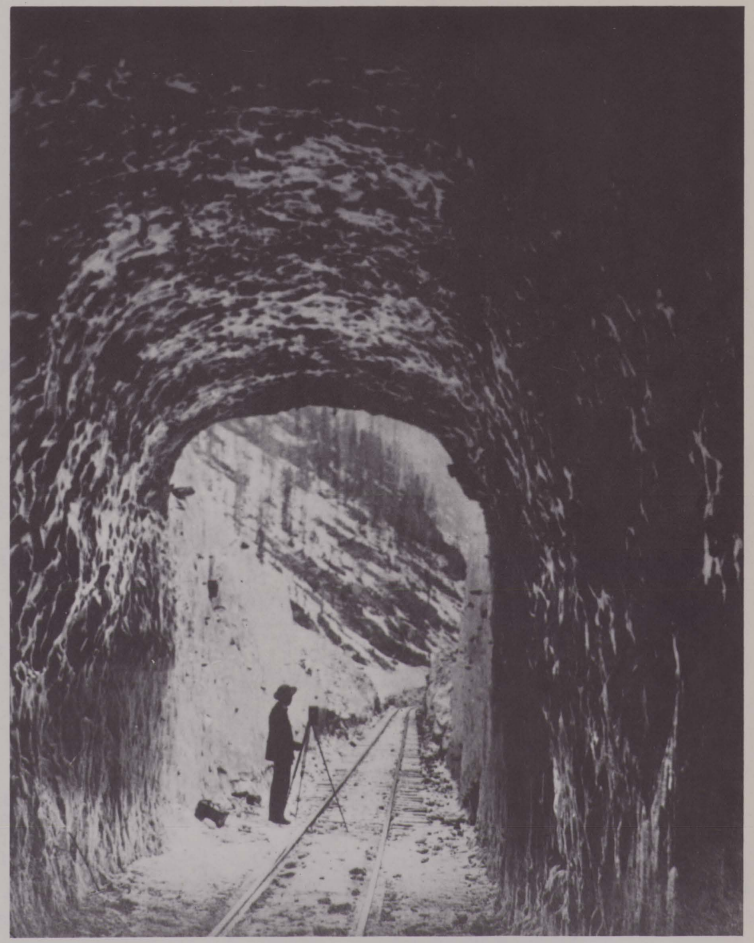

Figure 14. Snow tunnel excavated through avalanche debris on the tracs of the Denver and Rio Grande Railroad, Animas Canyon (date unknown). (from the collection of Marvin and Ruth Gregory)

> Malone, sleeping at his side, escaped uninjured by falling on the opposite side of the bed from Walker, thereby escaping the force of the avalanche, while Walker was caught and carried to his death. The cook at the mine was in bed and was lifted and carried along, as he described it, with about the same sensation as reposing in a sleeping car. He was gently deposited 150 feet distant from the building, still safe and unharmed, in bed. Such are the freaks of a Rocky Mountain snowslide.[125]

Sunday morning, a slide in North Star Gulch, now called by residents Powderhouse Gulch, crossed Mineral Creek and destroyed a powderhouse on Anvil Mt. (Map 15).

> One of the powderhouses in that locality was smashed and about a ton of giant powder scattered broadcast in the snow. Large spruce trees over two feet in circumference were cut off by the slide. The older residents of Silverton say that this is the first time this slide has ever run as far as Mineral Creek.[126]

More damaging slides were observed on Sunday. The Highland Mary lost a stone cabin that had stood for 30 years,[127] as well as its boarding house and engine room.[128] The last reported event was Sunday evening in Arastra Gulch when a house near the Silver Lake tramway midway terminal was destroyed by an avalanche from King Solomon Mountain. The one occupant was uninjured.[129]

No records of snowfall for this storm are available but it appears from newspaper accounts that it snowed constantly for a week and the wind blew throughout the period. It had been warm prior to the storm but no mention was made of storm temperatures.

The Silverton Standard of 31 March 1906 noted that

> Silverton has been closed to the world for two weeks...The storm was the most disastrous ever known to this region. A score of lives and more than a quarter of a million dollars in financial loss have been the costly toll to date.[130]

It was the next issue of the Standard that raised the question of a snowslide commission to regulate construction of buildings in dangerous locations (Appendix IV).

No mention was made in subsequent papers about abandoning any of the sites hit and all were apparently rebuilt and worked again. The Shenandoah boarding house was rebuilt in another place, but the local hazard was not eliminated, since the mine suffered minor damage in 1908 when a small slide took out the ore house,[131] and in 1911 when a slide swept away the transformer house, cutting off the power.[132] In January 1914 an avalanche swept over the mine.

> ...substantially in the same path as the fierce slide of March 17, 1906...Several miners were asleep in the bunkhouse ...when the slide broke with a roar...The blooming thing came so fast over the ridge that it passed several feet above us in the air. The Benjovsky cabin, which had stood on the North Star above for over 35 years, passed on over us with the slide.[133]

1915-1916

The winter of 1915-1916 could be characterized as a "mild" San Juan winter: only one large January storm was reported which produced avalanche damage to three active mines. The only fatalities of the winter occurred prior to this big January storm. Winter began with the first storm producing heavy snows during the week of 13 November.[134] No mention was found of more snow until late January but two avalanches involving people were reported. On 29 December, Tony Bartramelli was on his way from the Galty Boy Mine in Dry Gulch to the Henrietta Switch and "...was crossing near the top of the draw in which the slide named Dawn of Day runs..." (Map 3), when the slide broke above him, carrying him into the draw. He was able to dig himself out to tell his tale.[135] The second incident did not have a happy ending. Harvey Bennett, his wife and two other people were breaking trail across the slide path at the head of Rien Gulch, a branch of Stony Pass Creek (Map 7). Mrs. Bennett was still crossing the path when Mr. Bennett who, with the other members of the party had already reached safety, saw the avalanche break above her and rushed back in an attempt to save her. But both were carried nearly 1500 feet to the bottom of Salemhoffer Gulch "...as it is commonly known, though it is called Rien Gulch on Clason's map."[136] Ironically, Bennett was one of the nine men who had been dug out alive at the Shenandoah Mine disaster ten years before.[137]

The major storm of the winter occurred the week of 29 January 1916 when very heavy snowfall in the early part of the week blockaded the Denver and Rio Grande for a few days but produced only one heavy and damaging avalanche, "...outside of snowslides which ran from the precipitous walls of the canyon."[138] The Upper Gold King Mine (Map 3) lost its blacksmith shop and compressor building and suffered considerable damage to the upper terminal of the tramway. No injuries were reported.

> Thursday night, however, the storm increased in intensity and fierceness until it has reached proportions very seldom seen in these mountains. It likely means a heavy and long blockade..."[139]

The second part of the storm produced more avalanches which swept away one tower of the Sunnyside tramway and took out a bridge on the Silverton Gladstone Railroad. At the Kittimac Mine in Minnie Gulch (Map 8), avalanches from the big basins at the head of the gulch took out the upper tramway terminal building and breakover of the mine. With this new storm, "...the most severe that visited this section in the past generation and was so pronounced by many of our oldest timers...,"[140] all the snowslides in the Animas Canyon were down, the river banked and running over the tracks. The Denver and Rio Grande train to Durango encountered heavy drifts at mile post 477 (LaPlata County) and the engine left the coach to clear the tracks. The passengers, realizing that the coach was in a dangerous spot, abandoned it and moved a short distance away; a snowslide came down upon the coach, burying it completely.[141]

Possibly the only avalanche recorded as being profitable was described in the 12 February 1916 issue of the Standard. Two prospectors were looking for tungsten leads in Dry Gulch, Cement Creek (Map 3), when they heard the rumble of an avalanche and moved quickly to safety. After the slide was spent they noticed the boulders brought down by the slide contained tungsten and immediately began to scramble up the slide path to look for the deposits.[142]

The blockade was not lifted until 15 February[143] and the next and final reference to snow is the mention on March 11th that the snow on the mountain sides and among the trees was deeper than it had been for years.[144]

1928-1929

The decade of the 1920's could be characterized as lean in terms of the economy and the winters. In 1920, only 11 large operations and five smaller ones were producing, and several of those sporadically.[145] In February of 1927, the Silverton Standard reported that the winters for the previous five years had been very agreeable.[146] The winter of 1926-1927 was the only winter of the decade to record avalanche deaths. Destruction to property, with the exception of the 1926-1927 winter, was minimal during the decade. The winter of 1928-1929 saw a number of storms, avalanches and railroad blockades, yet very little damage and no deaths from avalanches were reported.

The first storm was reported on 13 October,[147] another on 17 November,[148] and a major snowfall, three to five feet on the high peaks, was reported on 1 December.[149]

> Auto trucking in most instances has been substituted by sled delivery of supplies...suplemented with mule pack train conveyance to mines at higher elevations.[150]

By 8 December snow was reported to be four to six feet deep in the mountains.[151] A snow storm the first four days of February caused no problem other than a 19-day blockade of the Denver and Rio Grande Railroad.[152] The blockade began early in February and was lifted 23 February.[153] The big avalanche at Needleton ran (Map 17, LaPlata County), covering the track a distance of 400 feet with depths up to 40 feet.[154]

> It is noteworthy that the many snowslides occurring in and around local mining camps during the past two weeks had little effect on regular mining operations.[155]

The only major damage from avalanches the entire winter occurred in February when several towers of the Iowa tramway in Arastra Gulch were removed by avalanches.[156] The King Solomon snowslide (Map 5), between Silverton and Howardsville, ran the week of 9 March and covered 1100 feet of the Silverton Northern Railroad track.[157]

Another storm occurred 22 March through 24 March, with avalanches knocking out power and telephone lines. "Fortunately, not one man in San Juan County was injured by the many snowslides occurring in and adjacent to mining camps."[158]

The last storm reported was the week of 6 April when a storm from the south hit Silverton. The Denver and Rio Grande was blocked for a short time by a slide three miles below town and the Silverton Northern Railroad was also slowed down by a slide.[159]

1935-1936

By the mid-1930's, attempts were being made to keep the Million Dollar Highway open year-round, although without modern snow removal equipment this was often difficult to do and large storms could still close the highway for several days.[160] The Denver and Rio Grande, the only railroad continuously operating in the county by this time, was still the major transportation system and in the winter of 1935-1936, as in most winters, the railroad was blockaded upon occasion. Winter was slow in starting with little snow in Silverton reported at the end of December,[161] and still no snow, warm days, very cold nights and freezing pipes at the beginning of February.[162]

This pattern was finally broken when, on 8 February, the heaviest storm of the winter with 12 inches of new snow, high winds and much drifting was reported by the Silverton Standard (now the only newspaper in the county). The Denver and Rio Grande Railroad was blocked by the Red Young slide (Map 16) eight miles south of Silverton, and also by the Cleveland slide (Map 15). A slide Sunday night, 2 February, wrecked the lower terminal which housed the sheave and other machinery, and the traction cable of the Pride of the West tramway (Map 7). The plant was not in operation at the time and all employees were safely in the boarding house which was built directly under a rock outcropping and thus protected from the direct impact (Figure 15).[163] Although the Pride of the West buildings were struck five times by avalanches, no mention was found of the boarding house being damaged by an avalanche, even though avalanches were known to run over the top of the building, occasionally removing the chimney.[164]

> Practically every slide in Cunningham Gulch ran either Saturday night or Sunday, although no other damage is reported in that section.[165]

It continued to snow every day of the week of 15 February with 24 inches of new snow reported. The roads were kept open until Friday, 14 February, when the effort became overwhelming and the road crews decided to wait out the storm before opening the roads again.[166] The results of this storm were reported in the 22 February issue of the Standard. In the Animas Canyon, the Silverton-bound train had to return to Durango when it encountered the Needleton snowslide, 18 miles from Silverton (Map 17, LaPlata County). This slide was estimated to be 65 feet deep in the deepest place[167] and had never been observed to run so large. Other slides in the canyon were observed to be smaller than usual.[168]

The most significant events were observed between Silverton and Howardsville, perhaps because the largest producer in operation during this period was the Shenandoah-Dives, with the mine in Arastra Gulch (Map 5) connected by tramway (which still stands) to the mill (now the Standard Metals Company mill,

Figure 15. Pride of the West Mine boarding house, 1975. (B. Armstrong photo)

Map 1) just north of Silverton. Early Monday morning, 17 February, a slide from near the top of Boulder Mountain covered the highway just north of the Shenandoah-Dives mill.[169]

> A huge tank used by the Shenandoah-Dives and set in the cliffs to one side of the gulch was wrecked by concussion from the slide, but without damage to company property.[170]

The Hematite snowslide (Map 6) ran at 4:00 p.m. Thursday afternoon, 20 February, from Tower Mountain and covered the highway 500 feet in length with depths from five to 15 feet.[171]

> The slide struck the new bridge across the Animas River, depositing snow on both ends of the structure and filled the river beneath. Planks in the center of the bridge were loosened by the force of the snow beneath...In past years the slide has been known to run causing inconvenience to the Silverton Northern Railroad and often shutting off Howardsville's water supply for a period of several hours. Never before, however, has it been known to run in such huge proportions...Old timers still are talking about the habits of snowslides and the entirely unexpected turns they sometimes take.[172]

Fortunately, only telephone poles were destroyed by the slide since dozens of vehicles and men were on the road at that time but had either just gone by the slide or had not yet arrived there.[173]

Another storm with high winds was reported on 29 February which blocked the highway from Durango to Silverton.[174] This stretch of highway was not opened until 1 March.[175] The Boiler slide in Cunningham Gulch (Map 7) came down Sunday, 23 February, covering the road for more than 100 feet. Monday morning, the Pride of the West slide (Map 6) covered the highway for a distance of more than 1000 feet with depths of between six and 15 feet and knocked down several telephone poles. The Lakawanna slide (Swansea Gulch) on Kendall Mountain (Map 1) ran much smaller than in previous years, with no property damage. The slide was reported to carry less timber than in many times in the past. The Irene slide up Cement Creek (Map 2 and Figure 11) covered the highway with no property damage reported.[176]

By 14 March the road between Silverton and Ouray was still not open and the Muleshoe snowslide and the slide between Chattanooga and the Iron Magnet Mine were reported down. It was noted that in Ouray County neither the Mother Cline nor the Riverside slides had run.[177]

APPENDIX I

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APPENDIX II

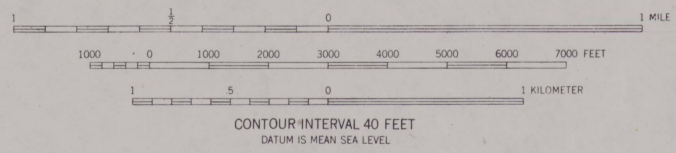
LOCATION OF AVALANCHE PROPERTY DAMAGE OR DEATHS

ON USGS 1:24,000 SCALE MAPS

Map Code

O	between 1 and 3 events at this site reported
+	4 or more events at this site reported
□	used in conjunction with one of the above symbols, indicates a general location. Precise location of site could not be determined.
————	aerial tramway

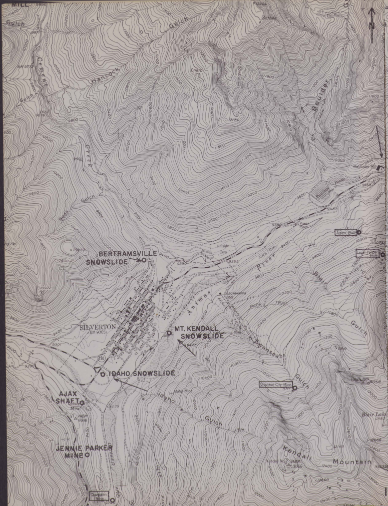
Map Scale



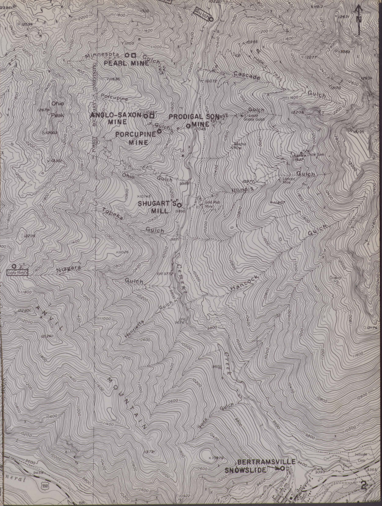
Road Classification

Light duty ——— Unimproved dirt - - - - - -

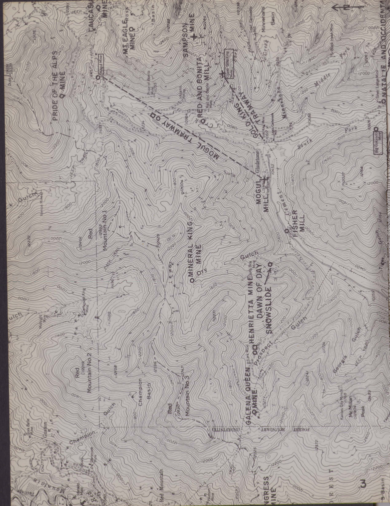
◯ State Route



BERTRAMSVILLE SNOWSLIDE
SILVERTON
MT. KENDALL SNOWSLIDE
IDAHO SNOWSLIDE
AJAX SHAFT
JENNIE PARKER MINE
Hancock
Gulch
Creek
Boulder
Animas
River
Swansea
Blair
Idaho
Kendall
Mountain
AIRSTRIP
PACK TRAIL



Minnesota Gulch
PEARL MINE
Cascade
Porcupine
Ohio Peak
ANGLO-SAXON MINE
PRODIGAL SON MINE
PORCUPINE MINE
Ohio Gulch
Illinois
SHUGART'S MILL
Topeka Gulch
Niagara Gulch
Cement Creek
Hancock
ANVIL MOUNTAIN
BERTRAMSVILLE SNOWSLIDE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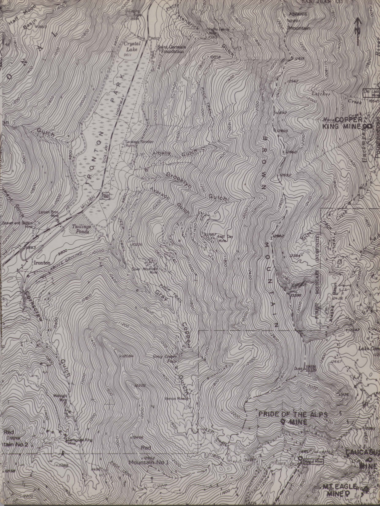
SAMPSON MINE
RED AND BONITA MILL
GOLD KING TRAMWAY
MOGUL TRAMWAY
MOGUL MILL
FISHER MILL
MINERAL KING MINE
HENRIETTA MINE
DAWN OF DAY
SNOWSLIDE
GALENA QUEEN MINE
CONGRESS MINE
Minnehaha Basin
Middle Fork
South Fork
Prospect Gulch
Georgia Gulch
Champion Basin
Champion Gulch
Red Mountain No. 1
Red Mountain No. 2
Red Mountain No. 3
FOREST BOUNDARY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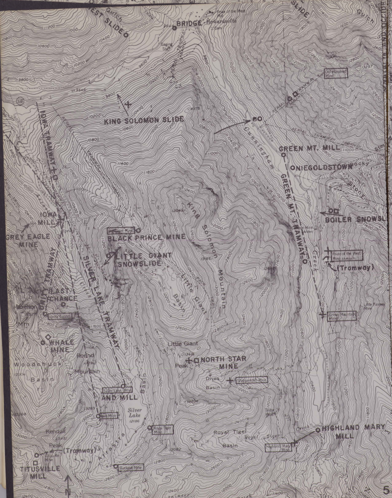
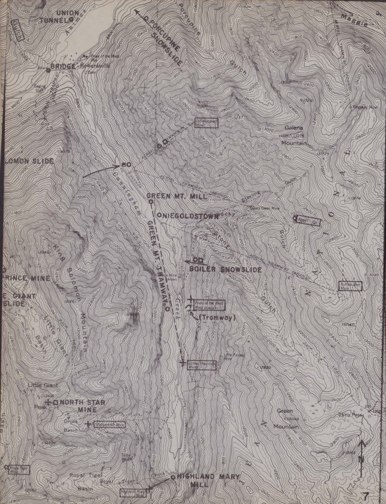
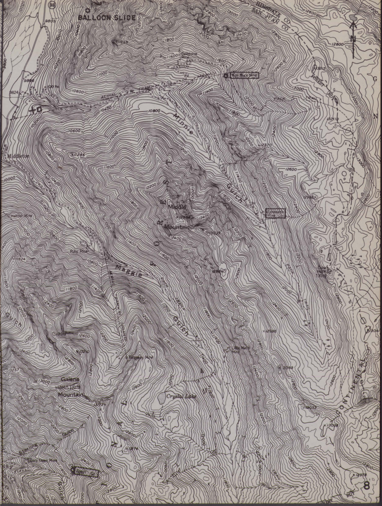
Saint Germain Foundation
Hendrick Gulch
Abrams Mountain
IRONTON PARK
Albany Gulch
Brooklyn Gulch
Tailings Ponds
Ironton
BROWN MOUNTAIN
COPPER KING MINE
Gray Copper Gulch
Corkscrew Gulch
PRIDE OF THE ALPS MINE
MT. EAGLE MINE
Red Mountain No. 1
Red Mountain No. 2


WEST SLIDE
BRIDGE
KING SOLOMON SLIDE
IOWA TRAMWAY
GREEN MT. MILL
ONIEGOLDSTOWN
Cunningham
GREEN MT. TRAMWAY
BOILER SNOWSL
IOWA MILL
GREY EAGLE MINE
BLACK PRINCE MINE
LITTLE GIANT SNOWSLIDE
King Solomon Mountain
Little Giant Basin
SILVER LAKE TRAMWAY
LAST CHANCE
(Tramway)
WHALE MINE
Round Mountain
Woodchuck Basin
Little Giant Peak
NORTH STAR MINE
Dives Basin
AND MILL
Silver Lake
Royal Tiger Basin
HIGHLAND MARY MILL
Kendall Peak
(Tramway)
TITUSVILLE MILL
N
5

N
KING LEAD MINE
Dome Mountain
Tower Mountain
Cataract Basin
Cataract Gulch
Hematite Basin
Macomber Peak
River
Middleton
UNION TUNNEL
Animas
PRIDE OF THE WEST SLIDE
BRIDGE
PORCUPINE SNOWSLIDE
Porcupine Gulch
KING SOLOMON SLIDE
IOWA TRAMWAY
Cunningham
GREEN MT. MILL
ONIEGOLDSTOWN
6


UNION TUNNEL
PORCUPINE SNOWSLIDE
BRIDGE
Galena Mountain
SOLOMON SLIDE
GREEN MT. MILL
ONIEGOLDSTOWN
BOILER SNOWSLIDE
PRINCE MINE
GIANT SLIDE
GREEN MT. TRAMWAY
(Tramway)
King Solomon Mountain
Little Giant Basin
Little Giant Peak
NORTH STAR MINE
Dives Basin
Royal Tiger Basin
HIGHLAND MARY MILL
Green Mountain
Stony Pass
Cunningham
Creek
Porcupine
Gulch
Maggie
Sterling
Stony
Gulch
N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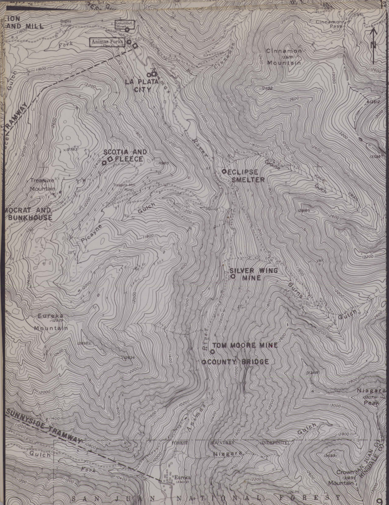
HINSDALE CO.
SAN JUAN CO.
Minnie
Gulch
Middleton
Middle Mountain
Maggie
Gulch
Galena Mountain
Crystal Lake
CONTINENTAL
N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Cinnamon Mountain
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Treasure Mountain
MOCRAT AND BUNKHOUSE
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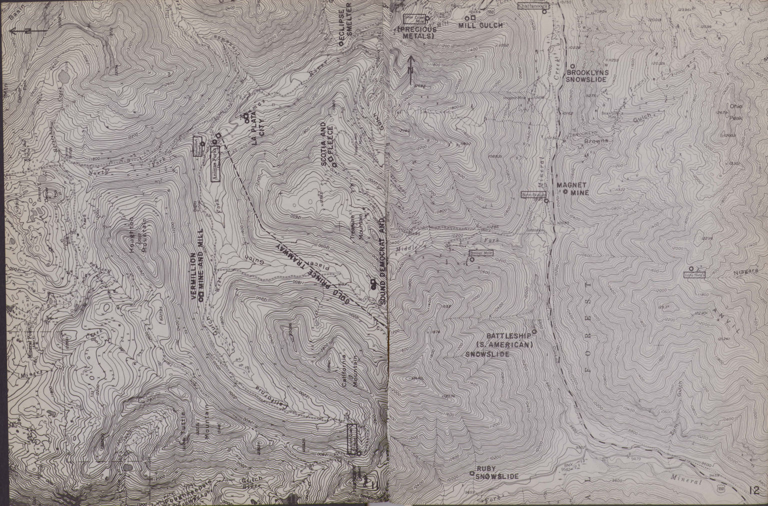
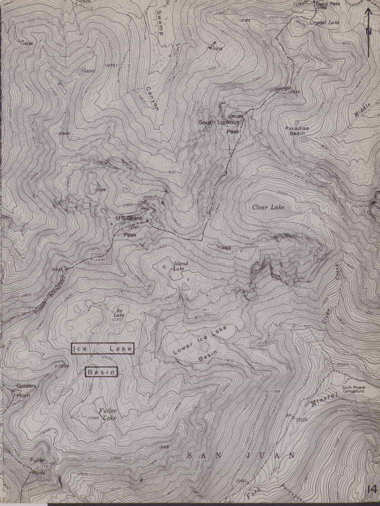
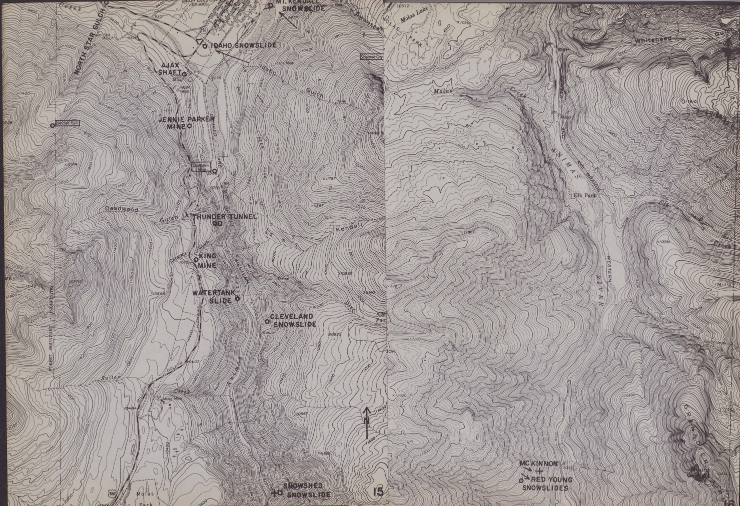
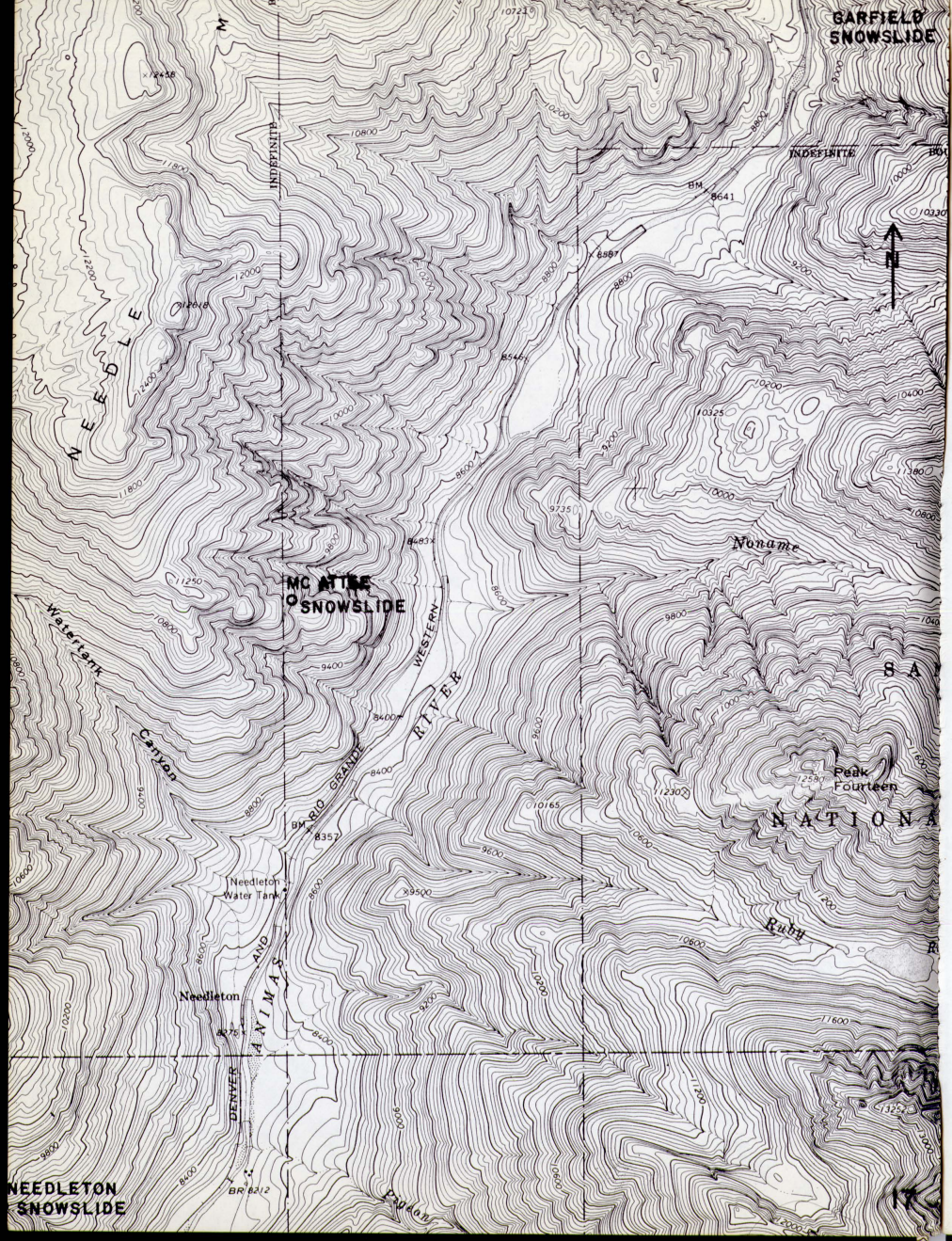
Picayne Gulch
Grouse Gulch
SILVER WING MINE
Burns Gulch
Eureka Mountain
TOM MOORE MINE
COUNTY BRIDGE
Animas River
Niagara Peak
SUNNYSIDE TRAMWAY
Gulch
Niagara Gulch
FOREST BOUNDARY INDEFINITE
Eureka
Crown Mountain
SAN JUAN NATIONAL FOREST
9


ECLIPSE SMELTER
SILVER WING MINE
TOM MOORE MINE
COUNTY BRIDGE
SCOTIA AND FLEECE
SOUND DEMOCRAT AND SUNLIGHT BUNKHOUSE
AND NEPTUNE
GOLD PRINCE
Eureka Mountain
TERRY PORTAL
SUNNYSIDE TRAMWAY
California Mountain
HARRISON AND BRENEMAN MINES
10


MILL GULCH
(PRECIOUS METALS)
Chattanooga
BROOKLYNS SNOWSLIDE
Ohio Peak
Browns Gulch
MAGNET MINE
Mineral Creek
FOREST
Niagara
BATTLESHIP (S. AMERICAN) SNOWSLIDE
RUBY SNOWSLIDE
Middle Fork
ECLIPSE SMELTER
LA PLATA CITY
SCOTIA AND FLEECE
VERMILLION MINE AND MILL
GOLD PRINCE TRAMWAY
SOUND DEMOCRAT AND
Placer Gulch
North Fork
Animas Fork
Houghton Mountain
California Mountain
California


Savage Basin
Imogene Pass
Telluride Peak
Ptarmigan Lake
Trico Peak
Ingram Basin
Ingram Lake
Ingram Creek
SAN MIGUEL CO
OURAY CO
SAN JUAN CO
Mineral Basin
Mineral Creek
Porphyry Basin
Porphyry Gulch
Bullion King Lake
U N C O M P A H G R E
Spirit Gulch
Campbird
Gulch
Red Mountain
Red Mountain Pass
CONGRESS MINE
Big Horn Gulch
SAN JUAN NATIONAL FOREST
SILVER LEDGE TRAMWAY
TELESCOPE MT. MINE
U S Basin

Ophir Pass
Crystal Lake
Swamp Canyon
South Lookout Peak
Paradise Basin
Clear Lake
U S Grant Peak
Island Lake
Ice Lake
Ice Lake Basin
Lower Ice Lake Basin
Golden Horn
Fuller Lake
Fuller Peak
South Mineral Campground
Mineral Creek
SAN JUAN


MT. KENDALL SNOWSLIDE
IDAHO SNOWSLIDE
NORTH STAR GULCH
AJAX SHAFT
JENNIE PARKER MINE
Idaho Gulch
Deadwood Gulch
THUNDER TUNNEL
KING MINE
WATERTANK SLIDE
CLEVELAND SNOWSLIDE
Kendall
Sultan Creek
Animas
SNOWSHED SNOWSLIDE
Molas Park
15
Molas Lake
Molas Creek
Whitehead Gulch
ANIMAS RIVER
Elk Park
Elk Creek
MCKINNON
RED YOUNG SNOWSLIDES
16



APPENDIX III

TABLES 8, 9, AND 10

TABLE 8

CHRONOLOGICAL COMPILATION OF AVALANCHES INVOLVING PEOPLE, ANIMALS AND PROPERTY

Winter month & day*	Deaths	Injured	Buried, Survived	Property Damaged+	Location	Map Number
1875-76	2				Woods Mt., near Columbus Mine	11
1876-77 4 March				smelter	Epley & Brown, La Plata City, ½ mi south of Animas Forks	11
1877-78 February	1				Henson Creek, Boulder Gulch	1
12 February	1				Poughkeepsie Gulch	4
15 February			1		near Hidden Treasure Mine	#
		2			Moltke Lode, Hanson Creek	#
			2		Silver Mountain	#
			1		Aspen Mine	1
8 March	4			cabin	Ajax shaft, Sultan Mt.	1
1878-79 25 January			4		Corn Exchange Gulch, Lookout Mt.	#
8 February	3				West side of Deep Creek	#
			1		Cunningham Gulch (later the same day, 1 of 3 men killed at Deep Creek (see above)	7
15 February	4			cabin	Highland Mary Mine	7
1879-80	- - - no incidents reported - - -					
1880-81 4 December			1		Poughkeepsie Gulch	4
1 January				blacksmith shop, cabin, only buried	Pride of the Alps Mine	3
1881-82	- - - no incidents reported - - -					
1882-83 2 December	1				above Highland Mary Mine	7
3 February	1		1		Little Charlie Mine	#
	1				near Eclipse Smelter	9
winter			1		Pride of the West Mine	7
10 February	1		1		Ruby snowslide	12
1883-84 15 December	1	2			near Silver Crown Mine	12
12 January			1		Picayune Gulch	10
January				coal house	Sampson Mine	3
9 February				ore house	Jennie Parker Mine	15
16 February			2		Ice Lake cabin	14#
			1	windlass & platform	Mineral King Mine	3
23 February				stable & cookhouse	Eclipse smelter	9
1 March	1				Kendall Mt.	1
7 March				shaft house, only hit	Columbus Mine	11
8 March				smelter, only hit	Eclipse Smelter	9
13 March				buildings	Green Mt. Mine	7
				cabin & warehouse	Pride of the West Mine	7
15 March				all buildings	Columbus Mine	11
	1	1		concentrator, smelting works, boarding house, barn, lower end of tramway	Sampson Mine	3
				4 buildings	Chattanooga	2
				mill, 2 cabins, 1 house	Neigoldstown	7
			1		Pride of the West Mine	7
1884-85 18 December			2		1 mi down from Beauty of the West Mine, Ice Lake Basin	14#
1885-86 23 January				boarding house & drier	Copper King Mine	4
				ore house	Black Heath Mine	1
			4	boarding house	Sampson Mill	3
				all buildings	Mineral King Mine	3

*Date event reported in newspaper
+Major damage unless otherwise noted
#Not mapped, exact location unknown

Winter month & day*	Deaths	Injured	Buried, Survived	Property Damaged+	Location	Map Number
				ore house & blacksmith shop	Mt. Eagle Mine	3
				blacksmith shop	Aspen Mine	1
				ore house, only hit	Legal Tender Mine	1
				all buildings	Jennie Parker Mine	15
23 January			1		North Star Gulch	15
13 February				county bridge	near Animas Forks	9
				Kemp Boys cabin	Poughkeepsie Gulch	4#
27 March				nearly all cabins	Georgia Gulch	3
Mar-April			1	cabin	Oriental Tunnel	5
				tunnel house, blacksmith shop & Clara Bell cabin	Magnet Tunnel	2
spring	1			16 dead horses	Burro Bridge snowslide	12
	1				(no location given)	
1886-87 29 January				all buildings	Highland Mary Mine	7
20 January				cabin	Boulder Gulch	1
19 February				cabin	Sultan Mt.	15
1887-88 12 January			4		Buckeye Mine	5
18 February	1				near N. Star Mine, King Solomon Mt.	7
1888-89 8 November	1				N. Star Mine, King Solomon Mt.	7
1889-90 November				mules buried	Whale Mine	5
14 December	1				Pearl snowslide	2
4 January			1		Silver Lake Mine	5
			5		Whale Mine	5
1890-91 7 February	1				hogback near N. Star Mine, King Solomon Mt.	7
			1		N. Star Mine, King Solomon Mt.	7
21 February	3	1			Belcher Mine	15
	3		2		Old Lout Mine	4
				building, only hit	Porcupine Mine	2
				bunkhouse	King Lead Mine	6
				bunkhouse	Titusville Mill	5
28 February				concentrator	Green Mt. Co. at Howardsville	6#
				Imodene Mill	Eureka	9
				iron car	Idaho Mine	1
			1	4 horses	Congress Mine	13
				tunnel, only buried	Caucasus Mine	4
				cabin	Mill Gulch	12
7 March			1		Mastadon (Placer) Gulch	11
	1				near Lists' cabin near Needleton	17#
21 March				shaft house	Neptune, Placer Gulch	11
1891-92 5 December				2 horses buried	Stony Pass	7#
31 December	1				near French Boys cabin, Cunningham Gulch	7#
1892-93 4 February			3	engine house & bunkhouse	Galena Queen Mine	3
			1		(no location given)	
1893-94	- - - no incidents reported - - -					
1894-95	- - - no incidents reported - - -					
1895-96 11 January	1				Eureka Gulch	10#
15 February			1		Eureka Gulch	10#
1896-97 15 January			1		Titusville trail, Kendall Mt.	5
	1				between Congress and Hudson Mines	13
16 January			2	blacksmith shop	Iowa Mine	5
(no date)	2				Prodigal Son Mine	2
16 January			1	horse buried	near Chattanooga	12
29 January			1		enroute to Telluride	#

Winter month & day*	Deaths	Injured	Buried, Survived	Property Damaged	Location	Map Number
				trestle work at ore house	Pearl Mine	2
27 February				corner of mill	Iowa Mill	5
13 March				cabin	Oriental Tunnel	5
27 March			1		enroute to Sunnyside Extension (Gold Prince Mine)	10#
1897-98 13 November					Tiger Mine	5
		1			west slope, Sheep Mt.	#
8 January			1	cabin	Harrison Mine	11
1898-99 3 December					Silver Lake Mill, Silver Lake Basin	5
16 December		3		mill, 1 end damaged	Black Diamond Mine	5
10 February				blacksmith shop	Sunnyside Mine Tramway	10
				8 tramway towers	Iowa Mine Tramway	5
1899- 16 February	1				Fleece Mine	10
1900 23 February	1				near Sampson Mine	3
	2		2		Picayune Gulch	10
	1				Hematite Gulch	6
1900-01 11 January			1		Red & Bonita	3
1901-02 7 March				mill	Gold King Mine	3
				powder house	Mogul Mill	3
				assay office	Highland Mary property	7
				ore & bunk houses	Iowa Mine	5
				tramway	Silver Lake Mine	5
				tramway	above Gladstone	3
	1			barn	Scotia Mine	10
				shaft house	Fleece Mine	10
				ore house roof, blacksmith shop	base of Green Mt.	7
14 March	1				Boston Mining Co., Gladstone	3#
				blacksmith shop	Black Prince Mine	7
1902-03 30 January				sheds, coal & blacksmith houses, 2 tramway towers	Gold King Mill	3
6 February				water line	near Magnet Tunnel	12
			2		Green Mt. Mine	7
				blacksmith & powder houses	Scranton City Mine	1
				bunkhouse, only hit	Union Tunnel	6
	1				Fairview Tunnel	2
3 April				blacksmith shop	near Bonita Mt.	3#
1903-04 29 January			2		North Star Mine, King Solomon Mt.	7
1904-05 24 December			1		Empire Mining Co., near La Plata City	#
20 January	1			boarding house	Natalie Mine	3
11 February				office, blacksmith shop	Rhodes & Roberts property near Eureka	9#
				tunnel, only covered	Irene Mine	2
18 February	2		1	cabin	Iowa-Tiger Mine	5
1905-06 26 January				ore bins, blacksmith shop & 2 tramway towers	Terry Tunnel of the Sunnyside Mine	10
			1		Sunnyside Mine	10
27 January	5			6 tramway towers	Natalie & Occidental Mine	3
				boarding house, office, compressor room, blacksmith shop	Old Hundred Mine	7
				tramway tower	Iowa	5
26 January				mill	Green Mt. Mine	7
27 January				tramway	near Old Hundred Mine	7
				house	Mogul Mill	3
17 March				power house, little damage	Mogul Mine	3
				tramway tower	Silverton, by Mt. Kendall snowslide	1
				3 cabins	Old Hundred Mill	7
				cabins		

Winter month & day*	Deaths	Injured	Buried, Survived	Property Damaged	Location	Map Number
24 March	1			bunkhouse	Sunlight, Placer Gulch	11
	1	1		bunkhouse	Silver Wing Mine	9
	12		9	bunkhouse, blacksmith shop	Shenandoah Mine	7
	1	2		boarding house	Unity Tunnel	5
	1	1		boarding house	Last Chance Mine	5
		1		Mrs. Johnson's cabin	below Last Chance Mine	5
				buildings	Notaway Mine	#
				mill	Iowa	5
				upper workings	Thunder Tunnel	15
				powder house	Anvil Mt. across from N. Star Gulch	12
	2			cabin	Bonner Mine	11
				compressor house, only buried	Gold Prince Mine	11
				compressor	Mountain Queen Mine	11
			1	boiler room, compressor house, stone cabin	Highland Mary Mill	7
				bunkhouse	Anglo-Saxon Mine	2
				stable, building, several tramway towers	Big Colorado Mine	3
	1	1		assay office, engine room, upper portion of mill	Green Mt. Mill	7
				powder & compressor houses & all buildings	Esmeralda Mine	8
1906-07 30 November				portion of compressor, old snow shed	Mountain Queen Mine	11
8 February				1 tramway tower removed 2 others twisted	Henrietta Mine	3
1907-08 7 March				slaughterhouse & cold storage plant	Mineral Creek, about 1 mi from Silverton	5
			1	oil house, transformer house, mill, slight damage	Iowa Mill	5
				2nd slide, $6,000 damage	Iowa Mill	5
1908-09 19 December				outer buildings, slight damage	Precious Metals Mine	12
				ore house	Shenandoah Mine	7
	1			furnace room in boarding house	Tom Moore Mine	9
30 January				main water line	Highland Mary Mine	7
			2		Gold King Mine	3
1909-10 1 January	1	1			Houghton Mt. close to Columbus Mine	11#
8 January				boarding house	Tom Moore Mine	9
	1			heating plant, cabin, part of sliming plant	Iowa Mill	5
				3 tramway towers	Silver Ledge Mine	13
				1 tower displaced, 2 completely covered	Sunnyside Mine	10
26 February			1		above Green Mt. Mine	7
5 March			1	mill, slightly damaged	Vermillion	11
1910-11 14 January		1			near Highland Mary Mine	7
21 January	1				Minnie Gulch, bridge below the falls	8#
11 March				transformer house	Shenandoah Mine	7
18 March	4	1		boarding house	Gold King Mine	3
1911-12 20 January				mill, slight damage	Mogul	3
				mill, slight damage	Vermillion	11
9 March				mill, slight damage	Mogul	3
				old boarding house	Gold King Mine	3
				mill, slight damage	Silver Lake, Silver Lake Basin	5
				mill, slight damage	Sunnyside	10
16 March			3		Sunnyside Mine	10
				boarding house	Gold King Mine	3

Winter month & day*	Deaths	Injured	Buried, Survived	Property Damaged+	Location	Map Number
16 March				all buildings	Telescope Mt. Mine	13
				buildings	Precious Metals Mine	12
				2 tramway towers	Silver Ledge Mine	12
				mill, slight damage	Iowa-Tiger	5
				2 tramway towers	Sunnyside Mine	10
				tramway terminal breakover & 2 towers	Kittimac Mine	8
1912-13	- - - no incidents reported - - -					
1913-14 13 December	1		1		3/4 mi Silverton side of Buffalo Boy Mine	7#
31 January				house, moved to railroad tracks	near Mogul Mill	3
				power line and Benjovsky cabin at N. Star Mine carried over Shenandoah boarding house	Shenandoah Mine	7
	1		1	Scotty Hill cabin	close to Shenandoah trail	7#
				Arrington's blacksmith shop & barn	Animas Forks	11#
				tramway	Kittimac Mine	8
winter	1				head of Rien Gulch	7
7 February				transformer	Pride of the West Mine	7
				3 tramway towers	Sunnyside Mine	10
				$1000 damage, mill	Iowa-Tiger	5
1914-15 20 February			1		near Lucky Friend Mine, Picayune Gulch	11
27 February	1				Champion Mine	15
6 March	1				near Arpad boarding house, Big Giant Mine	5
1915-16 1 January			1		Dawn of Day snowslide	3
8 January	2				head of Rien Gulch	7
29 January				bridge	Silverton Gladstone railroad	2 & 3
				1 tramway tower	Sunnyside Mine	10
				blacksmith shop, compressor building, upper terminal of tramway	Gold King Mine	3
				upper tramway terminal, building & breakover	Kittimac Mine	8
1916-17	- - - no incidents reported - - -					
1917-18 16 March				tramway	Iowa-Tiger Mine	5
				tramway	Pride of the West Mine	7
1918-19 1 March			1	team of horses buried	near Congress Mine	13
8 March				upper tramway tower	Iowa-Tiger Mine	5
22 March	2	1			Sunnyside Mine	10
29 March				Henry Miller's cabin	near Midway (halfway between Eureka & Sunnyside Mine)	10#
1919-20 6 March				mill, 1 tramway tower	Iowa-Tiger	5
1920-21	- - - no incidents reported - - -					
1921-22	- - - no incidents reported - - -					
1922-23	- - - no incidents reported - - -					
1923-24	- - - no incidents reported - - -					
1924-25	- - - no incidents reported - - -					
1925-26 3 April				1 mule killed	switchchback enroute to Buffalo Boy Mine	7#
1926-27 19 February				power poles	Porcupine snowslide near Howardsville	6
				blacksmith shop	Gold Prince Mine	11
				power & telephone line	Mayflower Mine	5
				power & telephone line	Iowa-Tiger Mine	5
	2				near Sunnyside Mine	10#
19 March				3 tramway towers	Mayflower Mine	5

Winter month & day*	Deaths	Injured	Buried, Survived	Property Damaged+	Location	Map Number
19 March				wheel torn out of mill	Iowa	5
1927-28 31 March	1		1		Cleveland snowslide, lower Animas Canyon	15
			1		Watertank snowslide	15
1928-29 February				several tramway towers	Iowa	5
1929-30	- - - no incidents reported - - -					
1930-31	- - - no incidents reported - - -					
1931-32 13 February				power & telephone lines	near Shenandoah-Dives Mill (Mayflower Mill)	1#
1932-33 4 February			1		Brooklyns snowslide	12
February					Battleship snowslide	12
1933-34	- - - no incidents reported - - -					
1934-35	- - - no incidents reported - - -					
1935-36 8 February				lower tramway terminal, 1 tower, traction cable	Pride of the West Mine	7
22 February				tank	near Shenandoah-Dives Mill	1#
				new bridge at Howardsville	Hematite snowslide	6
29 February				several telephone poles	Pride of the West snowslide	6
					Boiler snowslide	7
					Lakawanna snowslide	1
					Irene snowslide	2
1936-37 12 February				compressor house, power line	Pride of the West Mine	7
19 February				mule barn, lower tramway terminal, shed at portal #1, shed over the dump, mill	Pride of the West Mine	7
1937-38 4 March		2		1 tramway tower wrecked, 4 thrown out of line	Shenandoah-Dives Mine	5

*Date event reported in newspaper
+Major damage unless otherwise noted
#Not mapped, exact location unknown

TABLE 9

AVALANCHE OCCURRENCES BY GEOGRAPHIC LOCATION*

Site	Occurrence Date**	Run-out Distance when available	Map Number
SILVERTON AREA			
Titusville Mill	21 Feb 1891		5
Lime Kiln trail, Kendall Mt.	15 Jan 1897		5
Idaho Gulch	1879	to level of Blair St.	1
	28 Feb 1891	to level of Blair St.	
	31 Jan 1914	covered main railroad track	
	1913-1914+	destroyed bleachers in ball park and covered highway	
Mt. Kendall slide	Mar 1884		1
	17 Mar 1906	on railroad tracks near junction of Cement Creek and Animas River	
	10 April 1926	covered railroad tracks	
Scranton City Mine, Swansea Gulch	6 Feb 1903		1
SILVERTON TO GLADSTONE			
Irene snowlide	18 Feb 1905		2
	29 Feb 1936		
Shugart's Mill	10 Feb 1899		2
	16 Feb 1900		2
Porcupine Gulch			2
Prodigal Son Mine	16 Jan 1897		
Porcupine Mine	21 Feb 1891		
Anglo-Saxon Mine	24 Mar 1906		
Pearl Mine, Minnesota Gulch	14 Dec 1889		2
	27 Feb 1897		
Fairview Tunnel, Fairview Gulch	3 April 1903		2
	1929+	took out power poles	2
Sisson snowslide	6 Feb 1915	covered railroad tracks	2
Georgia Gulch	27 March 1886		3
Prospect Gulch			
Galena Queen Mine	4 Feb 1893		3
Henrietta Mine Tramway	8 Feb 1907		3
Dry Gulch			3
Dawn of Day snowslide	1 Jan 1916		
Mineral King Mine	16 Feb 1884		
	23 Jan 1886		
Fisher Mill (snowslide from east-facing slope)	22 Dec 1899	covered railroad tracks	3
GLADSTONE AREA			
Mogul Mill	7 Mar 1902		3
	17 Mar 1906		
	20 Jan 1912		
	31 Jan 1914		
Mogul tramway	17 Mar 1906		3
Big Colorado Mine	24 Mar 1906		3
Natalie and Occidental Mine	11 Feb 1905		3
	27 Jan 1906		
Sampson Mine	Jan 1884		3
	15 Mar 1884		
	23 Jan 1886		
	23 Feb 1900		

*Occurrences listed are those reported in the newspapers of the study period 1875-1938 or were learned of in interviews. The latter are marked with the following symbol: +. Only incidents which caused deaths, injuries and damage to property are listed.

**Date listed is newspaper issue date. Actual event date would be the week preceding the newspaper date.

#Not mapped, exact location unknown.

Site	Occurrence Date**	Run-out Distance when available	Map Number
Gold King Mine	7 Mar 1902		3
	30 Jan 1909		
	18 Mar 1911		
	9 Mar 1912		
	16 Mar 1912		
	26 Jan 1916		
Red & Bonita Mill	7 Mar 1902		3
Mogul Mine	9 Mar 1912		3
Pride of the Alps Mine	1 Jan 1881		3
Poughkeepsie Gulch			4
Old Lout Mine	21 Feb 1891		
Kemp Boy's cabin	13 Feb 1886		4#
Copper King Mine	23 Jan 1886		4
Ross Basin			11
Breneman Mine	19 Feb 1927		11
Harrison Mine	16 Dec 1898		4
Caucasus Mine	28 Feb 1891		11
Black Heath Mine	23 Jan 1886		4
Mt. Eagle Mine	23 Jan 1886		
SILVERTON TO HOWARDSVILLE			
Aspen Mine, Porter Tunnel	23 Jan 1886		1
	Feb 1878		
Legal Tender Mine	23 Jan 1886		1
Mill snowslide, just north of Mayflower Mill	13 Feb 1932		1
	22 Feb 1936		
Arastra Gulch			5
Whale Mine	Nov 1889		
	4 Jan 1890		
Unity Tunnel	24 Mar 1906		
Last Chance	24 Mar 1906		
Oriental Tunnel	spring 1886		
	27 Jan 1887		
Iowa Mill	13 Feb 1897		
	27 Jan 1906		
	24 Mar 1906		
	7 Mar 1908		
	8 Jan 1910		
	16 Mar 1912		
	7 Feb 1914		
	6 Mar 1920		
Iowa Tramway	7 Mar 1902		
	9 Mar 1918		
	8 Mar 1919		
	Feb 1929		
Little Giant snowslide (Mayflower tramway)	19 Mar 1927	to valley floor	
	4 Mar 1938		
Arpad boarding house, Big Giant Mine	6 Mar 1915		
North Star Mine, King Solomon Mt.	10 Mar 1888		
	8 Nov 1888		
	24 Dec 1904		
	14 Jan 1905		
3/4 mi from mine	7 Feb 1891		
50 feet from dump	7 Feb 1891		
French Boy's cabin	19 Mar 1892		#
Silver Lake Basin			5
Silver Lake Mine	1890		
Silver Lake Mill	10 Feb 1899		
	9 Mar 1912		
Iowa Mine-zigzags near mine	16 Jan 1897		
mine #3	16 Jan 1897		
	26 Jan 1906		
Tiger Mine	8 Jan 1898		
Buckeye Mine	14 Jan 1888		

Site	Occurrence Date**	Run-out Distance when available	Map Number
HOWARDSVILLE AREA			
King Solomon snowslide	29 Mar 1924	covered railroad tracks 1200' length, 10-15' deep	5
	19 Feb 1927	covered railroad tracks	
	26 Feb 1927	"butting against the toe of Tower Mt." 1600' length, 10-15' deep	
	9 Mar 1929	1100' railroad track covered	
Pride of the West snowslide (Bendel Gulch)	26 Feb 1936	covered highway 1000' length, 6-15' deep, knocked out telephone poles	6
Hematite Gulch	22 Jan 1887		6
	28 Feb 1891	1500' wide	
	11 Jan 1901 1924+	hit bridge	
	22 Feb 1936	covered highway 500' in length, 5-15' deep, hit new bridge	
Union Tunnel	6 Feb 1903		6
Cunningham Gulch			7
Old Hundred Mine tramway	26 Jan 1906		
cabins on north side of Old Hundred Mill	17 Mar 1906+	from King Solomon Mt.	
Green Mt. Mine	13 Mar 1884		
	6 Feb 1903		
	26 Feb 1910		
Green Mt. Mill	24 Mar 1906		
Green Mt. tramway	27 Jan 1906		
Neigoldstown	15 Mar 1884		
Buffalo Boy Mine 3/4 mi on Silverton side, in Stony Gulch	13 Dec 1913		
switchbacks enroute to mine	3 April 1926		
Boiler snowslide	29 Feb 1936	covered road 100' length	
Rien Gulch, head of	winter 1914		
	8 Jan 1916		
Pride of the West Mine	winter 1883		
	13 Mar 1884		
	7 Feb 1914		
	12 Feb 1937		
	19 Feb 1937		
Pride of the West tramway	9 Mar 1918		
	8 Feb 1936		
Shenandoah Mine	24 Mar 1906	to bottom of gulch and across the flat	
	19 Dec 1908		
	11 Mar 1911		
	31 Jan 1914		
Highland Mary Mine	15 Feb 1879		
	2 Dec 1882		
	29 Jan 1887		
	7 Mar 1902		
Highland Mary Mine and Mill water line	24 Mar 1906		7
	30 Jan 1909		
HOWARDSVILLE TO EUREKA			
Porcupine snowslide	18 Mar 1911	covered railroad tracks 600' length, 10' deep	6
	19 Feb 1927	took out power poles	
Minnie Gulch			8
Kittimac Mine and tramway	16 Mar 1912		
	Jan 1914		
	4 Feb 1916		
"bridge below the falls"	21 Feb 1911		#
Esmeralda Mine	7 April 1906		8
King Lead Mine	21 Feb 1891		6
EUREKA AND EUREKA GULCH AREA			
Sunnyside Mill	9 Mar 1912		9
Sunnyside Mine	16 Mar 1912		10
	22 Mar 1919		
	26 Feb 1927		
Terry Tunnel	27 Jan 1906		10
Sunnyside Mine tramway	10 Feb 1899		10
	27 Jan 1906		

Site	Occurrence Date**	Run-out Distance when available	Map Number
	8 Jan 1910		
	16 Mar 1912		
	7 Feb 1914		
	26 Jan 1916		
EUREKA TO ANIMAS FORKS			
Tom Moore Mine	19 Dec 1908		9
	8 Jan 1910		
	12 Mar 1921		
county bridge	13 Feb 1886		9
Silver Wing Mine	24 Mar 1906		9
Picayune Gulch			9
near Lucky Friend Mine	20 Feb 1915		10
Fleece ore house	23 Feb 1900		
	7 Mar 1902		
Scotia shaft house	7 Mar 1902		
Moory & Speery's smelter	winter 1874		#
Eclipse Smelter, Grouse Gulch	23 Feb 1884	"mile wide"	9
	8 Mar 1884		
La Plata City, ½ mi south of Animas Forks	4 Mar 1887		11
Empire Mining Company near La Plata City	20 Jan 1905		#
ANIMAS FORKS AREA			11
town	31 Jan 1914		
Columbus Mine	winter 1875-6		
	8 Mar 1884	from Wood Mt., ended 200 yards from town; over ½ mi wide, filled Animas Canyon	
	29 Mar 1884		
	1 Jan 1910	from Houghton Mt.	
Vermillion Mine & Mill	5 Mar 1910		
	20 Jan 1912		
Placer (Mastodon) Gulch	16 Feb 1884		
	15 Mar 1884		
	7 Mar 1891		
Neptune shaft house	21 Mar 1891		
Sound Democrat Mine	24 Mar 1906		
Sunlight bunkhouse	24 Mar 1906		
Gold Prince Mine	24 Mar 1906		
	19 Feb 1927		
California Gulch	15 Mar 1884		
Mountain Queen Mine	23 Mar 1906		
	30 Nov 1906		
SILVERTON TO RED MOUNTAIN PASS (HIGHWAY 550)			
Champion Mine	27 Feb 1915		15
	Feb 1932	concussion displaced Denver and Rio Grande Railroad bridge at bottom of Animas Canyon	
Little Dora, Ajax shaft	8 Mar 1878		15
Jennie Parker Mine	9 Feb 1884		15
	23 Jan 1886		
North Star Gulch (Belcher Basin)	23 Jan 1886		15
	21 Feb 1891		
	23 Mar 1906	crossed Mineral Creek, destroyed powder house on Anvil Mt.	
Burro Bridge snowslide	spring 1886		12
	13 Jan 1887		
Battleship (South American) snowslide	1932+		12
Magnet Mine	spring 1886		12
just north of mine	6 Feb 1903		12
Brooklyn snowslide	4 Feb 1933		12
Chattanooga	15 Mar 1884	snowslide from Independence Mt., n.w. of town ran down main street, 100' wide	12
	1939+	Telescope and Porcupine slides ran simultaneously and threw limbs as far as Chattanooga cabins. Lower switchback of highway covered with 11' of snow.	12

Site	Occurrence Date**	Run-out Distance when available	Map Number
Silver Crown (Precious Metals) Mine	15 Dec 1883 19 Dec 1908 16 Mar 1912		12
Mill Gulch	28 Feb 1891		12
Telescope Mt. Mine	16 Mar 1912		13
Silver Ledge Mine tramway	8 Jan 1910 6 Mar 1912		13
draw between Hudson & Congress Mines	15 Jan 1897		13
South Mineral Creek			14
Ice Lake Basin	16 Feb 1884 18 Dec 1884		
Middle Fork, Mineral Creek			
Ruby snowslide	10 Feb 1883		12
Bonner Mine	24 Mar 1906		12
LOWER ANIMAS CANYON (DENVER & RIO GRANDE RAILROAD)			
near Oro Tunnel	13 Mar 1903	covered railroad tracks 250' length, 25' deep	#
Thunder Tunnel	23 Mar 1906		15
King Mine	19 Jan 1935	covered railroad tracks 40' length, 15' deep	15
Cleveland snowslide	10 Mar 1928	15' deep, 300' length on railroad tracks	15
Red Young snowslide	10 Mar 1928 8 Feb 1936		16
Needleton snowslide	7 Mar 1891 9 Feb 1929 22 Feb 1936	400' length, depths up to 40' 65' deep in deepest place	17
McAttee snowslide	22 Mar 1924	blocked tracks	17
Snowden snowslide	Mar 1884 April 1884	84' deep at cut	#
Watertank snowslide	1927+	buried station depot agent while shoveling snow off tracks	15

*Occurrences listed are those reported in the newspapers of the study period 1879-1938, or were learned of in interviews. The latter are marked with the following symbol: +. Only incidents which caused deaths, injuries and damage to property are listed.

**Date listed is newspaper issue date. Actual event date would be the week preceding the newspaper date.

#Not mapped, exact location unknown.

TABLE 10

WINTER SUMMARY OF WEATHER DATA REPORTED IN THE NEWSPAPERS
DURING THE STUDY PERIOD 1879-1938

Year/Date	Newspaper	Weather Data
1879		
1 January	La Plata Miner	cold mornings, shirt sleeves in day
11 January	"	2'3" new snow
1 February	"	5" new snow
8 February	"	5" new snow, 1' on valley floor now
15 February	"	warm weather, 8-10" new snow, melting rapidly
1880-81		
23 October	La Plata Miner	first snowstorm last week, now warm weather
20 November	"	no snow for a month
1 January	"	heavy snow with wind
2 April	"	few storms during the winter of long duration or severity. Snowfall has not been excessive
1881-82		
11 February	La Plata Miner	snow 8-10" deep in Silverton
1882-83		
9 December	Animas Forks Pioneer	snow has nearly disappeared, south-facing slopes bare, snowing now, very cold
23 December	"	10" new snow last week
20 January	"	first severe storm of winter, likened to winter of 1870 and 1877, stormed 3 days, heavy winds and light snow, very cold.
3 February	La Plata Miner	"Yesterday Silverton was visited by the worst storm of snow and wind ever known in the history of the town."
	Animas Forks Pioneer	snow 24" deep on the level. "The season of disastrous snow slides has begun at last."
3 March	Red Mountain Pilot	snow off the trail between Red Mountain and Sweetville
1883-84		
15 December	La Plata Miner	heavy snowfall
29 December	Red Mountain Review	"One of the most terrible and persistent snow storms that has ever visited the San Juan country within the recollection of the oldest inhabitant or white settler commenced on Tuesday the 19th inst. and continued without intermission until Wednesday the 26th, lasting nine days. . . . lives have been lost and buildings swept out of existance." 5' of snow accumulated, snowfall general throughout the state, all communication destroyed
9 February	La Plata Miner	heavy storm, drifts 7' high, about 3' of new snow on ground in Silverton
	Animas Forks Pioneer	snowed in, 5' new snow "Snowslides innumerable from all points"
23 February	Animas Forks Pioneer	7 snowslides down between Animas Forks and Eureka on Monday
1 March	La Plata Miner	D&RG Railroad blockaded
	Animas Forks Pioneer	4 times as much snow than ever before known, many one story buildings covered, snow drifted in places 70' deep
8 March	"	several slides down, snow in streets 10' deep. 75 slides down between Animas Forks & Eureka
15 March	"	"Since the last storm, a reign of terror has spread over all this part of the country, such as was never known before." 16' of snow on the level, ". . . everything is in a very dangerous condition"
1884-85		
6 December	La Plata Miner	10-12" of snow in Ouray, 2-3" in Silverton
17 January	Animas Forks Pioneer	6" new snow
7 February	"	not more than 3" of snow fell in January, 1" fell last night
1885-86		
2 January	Animas Forks Pioneer	10" new snow
6 February	"	big storm
23 January	La Plata Miner	"Our Italian climate was caught in a small 'slide' this week, and crushed to death."
1886-87		
23 December	San Juan	"Last Friday and Saturday the high mountain ranges were visited by a very high wind and snow storm." In Silverton between 6-8" new snow fell
13 January	"	very severe storm on Ouray side of Red Mountain
22 January	Silverton Democrat	". . . snow slides tumbling all about the San Juans just now"
1887-88		
26 November	Silverton Democrat	about 1' snow fell in 3 days
7 January	"	"Silverton has been visited this week with the most severe storm of the season. Over 1 foot of snow has fallen, which, owing to the high winds that have prevailed has been considerably drifted and will no doubt cause many snow slides."
18 February	"	"There is less snow in the mountains above Silverton at the present time than was ever before known at this season of the year". 8" in Silverton
10 March	"	heaviest storm of the season, 2' new snow
1888-89		

Year/Date	Newspaper	Weather Data
1889-90		
7 December	Silverton Standard	On 4 December, rained all day, never seen before even by old timers here for past 15 years.
18 January	"	less snow on Ophir side of range than on Silverton side, burro train still running
25 January	"	snow 7' deep on the level at Red Mountain
8 February	"	warm, spring-like weather
15 February	"	Ouray and Montrose got good snowstorm, Silverton only got a little wind
22 February	"	"During the past week we have had the stormiest weather seen in the San Juan since the winter of 1883-84." no train from Durango for last 2 days
5 April	"	quite a bit of snow still, still snowing and blowing
1890-91		
6 December	Silverton Standard	more snow in town than in the hills
20 December	"	very little snow, trails to N. Star, Solomon, and Silver Lake still open
10 January	"	light winter so far, very little snow, still packing from N. Star, Solomon, down summer trail over the hog back
31 January	"	"The snow this week came as a blessing. The main street was bare and it was impossible to get a sleigh up town."
7 February	"	heavy storm at Red Mountain, heavier than in Silverton, 6" new snow in town. ". . . still have the spring time season we have enjoyed all winter."
21 February	"	storm cleared off yesterday, one of the heaviest seen in many years, 2-3" new snow, heavy winds. "The old snow was all granulated and had a light crust on it, and when a little of the new had fallen it commenced sliding in all directions." no train
28 February	"	"everything in the county that could slide has done so." Snow reported 12' deep on the level at Red Mountain
21 March	"	"The snow slides have been simply fearful, nothing of the kind has been seen for the last 12 years. The oldest timer in this district never saw anything of the kind. . . Telluride has not missed a train this winter. . . If you want to see some very fine weather come to the San Juan country - in the summer."
1891-92		
21 November	Silverton Standard	"This has been the dryest fall in the San Juan for many years."
5 December	"	first storm of the season, very little snow but wind blowing hard
12 December	"	"The hard winter predicted . . . appears to be a myth."
1892-93		
31 December	Silverton Standard	first railroad blockade of winter
4 February	"	heavy storms, D&RG train delayed
1893-94		
3 February	Silverton Standard	6" of snow in Silverton
17 February	"	last week 20" snow fell in Durango, 2" in Silverton
1894-95		
22 December	Silverton Standard	"There has been a number of narrow escapes from snow slides already this winter. Nearly every day we hear of them, miners who are compelled to travel in the mountains should be very careful."
16 February	"	"So far this winter, San Juan county has escaped a fatal or disastrous snow slide. The miners and all who have occasion to travel are very careful not to venture out until the snow has settled."
1895-96		
8 February	Silverton Standard	so far, a fairly light winter
1896-97		
15 January	Silverton Weekly Miner	very heavy snow over the last 24 hours
16 January	Silverton Standard	"The bottom layer of snow is granulated and the top layer is soft and heavy. This will cause slides. Even the most expert snowshoer should be wary of climbing the mountains until the slides have run."
26 February	Silverton Weekly Miner	Silverton blockaded for past 10 days, worst since 1891.
27 February	Silverton Standard	snow 8' deep on the level at South Mineral Creek
27 March	"	heavy snowfall
3 April	"	on 1 April, 1' of snow and ice remaining in Silverton
1897-98		
	Silverton Standard (1 March 1913)	winter of 1897-98 was mild, very little snow fell up to March 1st and the weather with the exception of a few days was pleasant, railroad traffic wasn't blockaded one day and roads and trails were kept open
1898-99		
10 February	Silverton Weekly Miner	"The storm of the past week has been the most disastrous experienced in San Juan county for many years, and the awful avalanche has been playing havoc in many sections of the county." Railroad blockade, at Animas Forks, heavier snow than for several years past
1899-1900		
15 December	Silverton Weekly Miner	first big snow storm of the winter
2 February	"	little snow, using wagons instead of sleighs
1900-01		
23 November	Silverton Weekly Miner	heavy storm with high winds, 3' of snow fell in Silverton, 4-6' in mountains
1901-02		
21 February	Silverton Weekly Miner	heavy snow in mountains

Year/Date	Newspaper	Weather Data
7 March	Silverton Weekly Miner	"The past week has seen the largest and heaviest snow slides that San Juan county has known for many years. While the slides have not been confined to any particular portion of the camp, the heaviest so far reported have been on upper Cement Creek, near Gladstone. . . . Slides are so numerous in all directions that no mountain trail is considered safe and the most experienced miner hesitates before risking his life down the treacherous and dangerous trails."
1902-03		
30 January	Silverton Weekly Miner	"The snow and wind storm of Tuesday night and Wednesday was the worst of the season."
6 February	"	"The storm of Friday night through Sunday was one of the worst experienced in this section in years." about 2' of new snow fell in Silverton, drifting to 4-5' and caused many small snowslides, no train, no Red Mountain stage
1903-04		
19 February	Silverton Weekly Miner	during the snowstorm this week, 12" new snow in Silverton, 24" at Red Mountain, Gladstone and Animas Forks, 30" above timberline
26 February	"	heavy snow this week brought the prospectors down from the mountains
1904-05		
30 December	Silverton Weekly Miner	first real storm of the winter, 8" new snow fell in Silverton with heavy winds, snow in the mountains heavier. storm followed by 3 days of cold weather, moderate now
14 January	Silverton Standard	heavy snow storm of 3 day duration, then cold wave
4 February	"	snowed Tuesday through Thursday, train blockaded
18 February	"	2 week storm over
25 February	"	first train from Durango for 3 weeks arrived Monday
1905-06		
2 December	Silverton Standard	storm Sunday and Monday ". . . was fully equal in severity to any of last winter." 2' in Silverton, more up above, high winds and drifting
27 January	"	"Silverton Closed to the World. . . The snow fell fiercely and continuously for 3 days, then a howling gale eddied it into tremendous drifts that paralyzed traffic and shut this region in from the world outside and the outlying camps from this city, their supply point."
24 February	"	snow rapidly melting, trails open
5 March	"	5" new snow, traffic not hampered
17 March	"	"Record Breaking Storm for San Juan, This Section in the Fierce Grip of the Elements. Snowing a Week and no Let-Up - All Traffic at a Standstill in Mining District. . . The snowfall now is heavier in quality and quantity the weather warmed and dangerous slides more liable to occur." the storm began last Sunday morning. "Before that there was a spell of weather that spoke of coming springtime." a thaw and bare streets. "Snow fell almost continuously until Wednesday when the sun broke through. . . Along with the snow, a strong wind has raged, which has filled the cuts and canons and drifted the snow to the eaves."
24 March	"	"After a week of unbroken storm Monday dawned clear and warm and the deep snow began melting rapidly."
31 March	"	"For nearly three weeks there had been an almost continuous downfall, with the face of Old Sol showing through the clouds at infrequent intervals. . . First sunshine and then storm would alternate, and at last the genial rays of the glorious orb conquered. . . With the coming of genial weather the snow is disappearing like magic. . ."
1906-07		
26 October	Silverton Weekly Miner	storm last Saturday, 18" of new snow in Silverton, wind blowing Sunday through Monday, ended on Tuesday. "However, Silverton and the San Juan takes their weather as it comes and pronounces it always 'unusual' and the worst in its history."
4 January	"	storm New Year's Day, trains stopped on Gladstone branch for one day only, Denver train 4 hours late, no trouble on Silverton Northern Railroad to Eureka but "Thus far the traffic between Eureka and Animas Forks has not been resumed, but it is expected that trains will shortly be running through to the Forks."
11 January	"	storm last week
15 February	"	road between Animas Forks and Eureka opened so that trip could be easily made with sleds; pack trains continue to come and go and Animas Forks so far is not shut in due to snow.
22 March	"	snowing today
1907-08		
8 February	Silverton Standard	16" new snow, severe storm but more severe in other parts of the San Juan
7 March	"	very heavy storm
1908-09		
19 December	Silverton Standard	"One of the most severe storms experienced in this section in years began Tuesday by a heavy fall of granulated snow which later developed into heavy wet slush and later . . . into a howling blizzard."
23 January	"	storm blocked trails with several feet of snow
30 January	"	heavy storm with much drifting, reminded of winter of 1884, many slides ". . . were comparatively light when the severity of the storm is considered."
20 February	"	heavy storm, 14th day of blockade
1909-10		
18 December	Silverton Standard	heavy snow past 2 weeks, regular railroad traffic to Animas Forks and Red Mountain cutoff
1 January	"	storm severest of the season, heavy fall of very wet snow Thursday evening through Friday, Saturday temperatures dropped and wind developed into howling blizzard until early Wednesday morning, when it cleared off with a heavy frost. Wednesday night temperature reached 34° below zero. "The peculiar conditions of the storm very soon convinced those who are familiar with weather conditions in the San Juan mountains that it not only meant a serious blockade, but also that the running of many snow slides with threatened destruction of life and property."
5 March	"	"The warm weather of the past week has brought down slides in the Animas canon."
1910-11		

Year/Date	Newspaper	Weather Data
1911-12		
11 November	Silverton Standard	heavy snow storm closed trails to many mines
18 November	"	very heavy blizzard, most severe storm in Silverton's history
9 March	"	Silverton blockaded for the first time this winter
16 March	"	storming for past 10 days, snowfall heaviest of the winter and exceeded that of any winter since 1906
1912-13		
1 March	Silverton Standard	Silverton blockaded for the first time this winter Wednesday night
1913-14		
6 December	Silverton Standard	heavy snowfall
13 December	"	first heavy snow of winter
14 January	"	recent heavy snowstorm
7 February	"	storm and railroad blockade
1914-15		
6 February	Silverton Standard	heavy storm
13 February	"	because of light winter snowfalls, pipes are beginning to freeze
1915-16		
13 November	Silverton Standard	big storm with heavy snow
29 January	"	very heavy snowfall. "Thursday night. . . the storm increased in intensity and fierceness until it has reached proportions very seldom seen in these mountains. It likely means a heavy and long blockade."
11 March	"	snow on mountain sides and in the trees is deeper than it has been for years
1916-17		
18 November	Silverton Standard	considerable depth of snow has fallen, many prospectors coming in for the winter
1 January	"	1 week blockade ended
31 March	"	trail to Shenandoah mine has been kept open all winter
1917-18		
5 January	Silverton Standard	"For the first time in 14 years, San Juan county celebrated Christmas and New Year's day without any snow on the streets and very little snow within the county." all roads open
26 January	"	recent snowstorms and extreme cold weather
9 March	"	heavy rain in Durango, snow and wind in Silverton. "The snowfall this week has been heavier than at any time this winter. . ." short blockade
1918-19		
1 March	Silverton Standard	road to Eureka blocked, train from Durango not expected for 3-4 days, last Monday morning, the passenger train to Durango hit by a snowslide
1919-20		
29 November	Silverton Standard	"The big storm this week is remarkable not only for the severity of it, but that it is the largest for this time of year since 1880 when in the first week of October the snow fell fully 4 feet here in the park. The present fall of snow will average fully 40" and the railroad blocked between here and Durango. . ."
6 December	Silverton Standard	storm
13 December	"	storm started last Friday and lasted 3 days, blockaded road between Silverton and Durango and Silverton and Red Mountain. The snow ". . . will not hold the weight of an animal."
20 December	"	blizzard
28 February	"	severe storm over southwestern Colorado last week, short blockade
13 March	"	17 day blockade lifted
1920-21		
18 December	Silverton Standard	good weather, still packing out ore
29 January	"	D&RG blockaded over a week, now open
12 February	"	storm began Thursday night, slowed down Saturday, snowed intermittently until it cleared Monday
1921-22		
24 December	Silverton Standard	heavy snowstorm
31 December	"	heavy snow
4 February	"	big storm, 4 horses used on snowplow
18 February	"	high winds blew out windows at high school
25 March	"	heaviest storm of the season, 30" of snow fell in 3 days "Slides did their full part running in many sections and without the loss of either life or property."
1922-23		
9 December	Silverton Standard	heavy snows made it impossible to use a car between Silverton and Eureka, 4 mule team used for daily stage now
16 December	"	for the third time in 20 years, Silverton is without train service in the forepart of December, week of stormy weather and heavy snow
20 January	"	fine weather, streets bare, no snow has fallen for more than a month
17 February	"	"Seldom does the district have a combination snow and wind storm, but when it does, look out." light snow and heavy wind, much drifting
24 February	"	probably the mildest winter so far in 25 years
1923-24		
26 January	Silverton Standard	willows blooming in January at Silver Lake Mill, milder than usual winter weather
23 February	"	first robin spotted, no deep snowbanks along highway this winter
22 March	"	recent storm hit Silverton district harder than any storm of the winter
1924-25		
13 December	Silverton Standard	more snow on north side of Red Mountain than Silverton side, badly drifted. Merchants switched from trucks to sleds after recent snow
7 February	"	"The snow fall the past month or 6 weeks has not been heavy enough to cause slides without the assistance of thawing weather."
14 March	"	heaviest storm of the winter, Saturday through Monday 30" of snow fell in Silverton with high winds and much drifting

Year/Date	Newspaper	Weather Data
1925-26		
2 January	Silverton Standard	weather has been glorious, sunny days, -10°F at night
6 February	"	from October 1924-January 21, 1925, a total of 99" of snowfall recorded. From November 1925 until February 1, 1926, only 37" of snowfall recorded
3 February	"	"After a mild winter. . . snow is falling steadily, making up for the strange lack of the nice white downy flakes for so many months. So we are getting it, good and plenty."
1926-27		
4 December	Silverton Standard	first heavy snowfall of the season, between 18" and 2' of new snow
5 February	"	"The last 5 years have been very agreeable."
19 February	"	big storm of the season and worst since 1906, between Sunday and Wednesday, 3' new snow in Silverton, occasional blizzard conditions but mostly slow steady snowfall. For first time in 6 years, the Silverton Northern Railroad put on its snowplow to get through the North Star slide. no D&RG train.
26 February	"	"The storm of Friday and Saturday dropped 1 foot of snow which started slides anew bringing down several big ones that had not moved and in many cases was the undoing of what had been accomplished the 2 preceding days."
5 March	"	another big storm on Friday
12 March	"	heavy fall of snow due to ". . . atmospheric depression now prevailing throughout the southwest and the San Juan range. . ." 3' new snow, 50 men working on this end of the Animas Canyon have been withdrawn until the storm stops. "Snow slides are again running and danger lurks everywhere in the slide area."
1927-28		
17 December	Silverton Standard	snowstorm started Saturday afternoon, by Monday evening an average of 2' in town
24 December	"	another storm for last 3-4 days, very cold nights, 26° below zero
24 March	"	more snow on north side of Red Mountain than in Silverton
31 March	"	the second interruption of train service between Silverton & Durango since October
1928-29		
17 November	Silverton Standard	snowstorm
1 December	"	heavy snowfall, 3-5' new snow in high peaks "Auto trucking in most instances has been substituted by sled delivery of supplies. . . supplemented with mule pack train conveyance to mines at higher elevations."
8 December	"	snow 4-6' deep in mountains, -20°F and warm sunny days
9 February	"	storm February 1-4, railroad blockade
23 February	"	blockade lifted after 19 days
30 March	"	snowstorm last Friday through Sunday. "Fortunately, not one man in San Juan county was injured by the many snow slides occurring in and adjacent to mining camps."
6 April	"	snowstorm from the south hit Silverton
1929-30		
1 December	Silverton Standard	streets dusty, warm clear weather
21 December	"	snow began Thursday, still snowing, 10" so far
11 January	"	"The recent storm closed the Ouray and Durango highways; but they intend to have them open in a few days."
15 February	"	little snow, roads almost all clear
1 March	"	snowstorm with winds
29 March	"	Million Dollar Highway opening started
1930-31		
3 January	Silverton Standard	December weather: clear warm days, no snow
24 January	"	still no snow
31 January	"	so far, just one heavy snowfall around Thanksgiving
21 February	"	little snow, 8" new snow, now sunny again, one of the lightest winters ever
28 February	"	little snow, lots of sun
21 March	"	so far, less than 4' of snow has fallen
28 March	"	5" of new snow in Silverton, more in the mountains
1931-32		
5 December	Silverton Standard	heavy storm began November 18, lasted 4 days, then very cold temperatures
12 December	"	another storm, 10" more snow, more in Durango than in Silverton
16 January	"	storm, 12" or less, high winds ". . . one of the most disagreeable storms of the winter"
6 February	"	less than 1' of new snow fell during the last storm, wind
13 February	"	". . . this section has been in the clutches of an old time February storm which bears indication of equaling records of former years." snowed Saturday through Wednesday, wet snow with warm weather
20 February	"	railroad blockade began, no telephone or telegraph service
30 April	"	another snowstorm
7 May	"	end of 90 day blockade
1932-33		
29 October	Silverton Standard	16" new snow fell in 7 hours Monday, total depth 20" in town, 2' of snow reported on Molas Pass, only 10" at Chattanooga with less at Red Mountain Pass and hardly any in Ouray
17 December	"	storm with high winds and drifting closed highway
21 January	"	storm Sunday with high winds
1933-34		
16 December	Silverton Standard	heavy snow
27 January	"	less than half the usual snow at this time of year and no snow in the last several weeks no snow in town, pansies leaves turning green
24 February	"	first storm of the winter, 18" new snow in Silverton, 12" at Red Mountain, 10" at Chattanooga. "Snow which had fallen earlier in the winter had crystallized during the long spell of fine weather and formed no footing for the new snow and explains fully the number of slides reported as following one of the lightest February storms in recent years."
7 April	"	late storm dumped between 12-20" new snow in Silverton, very warm

Year/Date	Newspaper	Weather Data
1934-35		
22 December	Silverton Standard	slightly more snow now than last year at this time
29 December	"	heavy snow in Ouray, 2'; little snow in Silverton.
19 January	Silverton Standard	largest snowfall in 2 years
2 February	"	blizzard
9 February	"	big snowfall
23 February	"	5' snow between Silverton and Ouray, 6-8' between Silverton and Durango
9 March	"	snowing and blowing hard
1935-36		
28 December	Silverton Standard	hardly any snow in town
4 January	"	warm weather, 10" new snow
1 February	"	warm weather, no snow, pipes freezing
8 February	"	heaviest storm of the winter, 12" new snow, high winds and drifting "Practically every slide in Cunningham Gulch ran either Saturday night or Sunday, although no other damage is reported in that section."
15 February	"	snow every day this week, about 2' new snow, roads were open until Friday and will open again when the storm is over
29 February	"	heavy storm with high winds
7 March	"	18 day blockade lifted March first
14 March	"	road between Silverton and Ouray still not open
1936-37		
12 February	Silverton Standard	big storm, closed railroad and highway, 12" new snow and wind
19 February	"	9 day blockade of highway lifted
1937-38		
4 March	Silverton Standard	"In the aftermath of Southern California's heaviest storm in 61 years, San Juan County and Silverton had 36+ hours of heavy snowfall." about 24" of new snow with high winds
1 April	"	snowfall so far this winter, 172" in Silverton; for the winter of 1936-37, 154"

APPENDIX IV

MISCELLANEOUS MATERIAL

SILVERTON STANDARD

Saturday, 7 April 1906

A Snowslide Commission

The Standard has a suggestion to offer which it believes will be of great practical good to every mining camp in Colorado. Before venturing to make public its ideas on the subject it sought the opinions of practical mining men of long experience and found them not only willing to co-operate but enthusiastic to have the matter taken up and brought into practical form.

Briefly, it is to have a state law enacted by which mining counties may appoint inspectors, or a commission, clothed with the power of protecting, so far as possible, lives and property from snowslides.

There are horticultural inspectors to guard the orchards from disease, there are cattle inspectors to protect the herdsmen, there are coal and metalliferous mine inspectors to guard the lives of the workmen, there are dairy inspectors to keep wholesome the milk supply. These and numerous others of like kind are found not only valuable but absolutely necessary to protect the public.

Similar methods are even more necessary to protect lives and property within the reach of the deadly avalanche. Because we have never had such legislation is no valid reason that we should not now be provided with it or that the scheme is impracticable.

Had a commission composed of practical mining men been consulted the Green Mountain mill would not have been built where it now is and one life and much financially been saved. Had there been inspectors to watch the safety of the working miners perhaps the men would have been called away from the Shenandoah mine before the avalanche swept them to their death. Invested with police powers a commission like this would be a force for good, when great snowfalls load the mountainsides with their freightage of death and devastation.

But these duties would be but incidental to the true object of the commission. First, the commission should be composed of, say, three men of long experience with the conditions peculiar to their locality. There are certain defined places where snowslides run. Statistics, old and new, should be gathered in order that the danger points may be known and avoided as far as possible. It is said conditions change and that slides came down last month where never before. The more reason that an official record should be kept of them, for memory is treacherous.

The Green Mountain management was not the only one to tempt Providence by planting its property in a treacherous place when absolute safety might be had in some other locality nearby. There are many others. Were a commission given plenary powers in the location of such plants both capital and lives would be guarded by the wisdom of experience instead of the immature judgment of tenderfoot M.E.'s knowing and caring nothing about snow conditions. Upon such a commission should the power be bestowed to decide whether sites for such buildings are safe or unsafe, and their licenses issued accordingly. No building may be erected in cities except it comply with certain defined regulations, and there is no reason why like restrictions should not be applied to mines and mills.

The Standard would like to see this subject taken up and discussed by the newspapers of the mining sections. The ideas here expressed may be rudimentary, but the more reason that our contemporaries should improve on them and if there is merit in the proposition to join in pushing it along.

LETTERS FROM COLORADO

H.L. Wason, 1887: Cupples and Hurd, Boston, Mass. pp. 154-156.

The Slide at the Empire Mine.

All day a steady snow had drifted down,
Hiding the restful hues of dun and brown
On friendly hill-side, and the slender trail,
That bound us world-ward. Did no spirit quail
At the appaling doom looming before us,
With the unsettled snow-mass trembling o'er us?

If any feared, none spake; the laugh and zest
Rang out as clear, perhaps with added zest.
And but that they who worked at night-shift stood
With outstretched palms, in half unwilling mood
To leave the fire, no outward sign betrayed
If any felt discouraged or dismayed.

The storm had lulled, but the insatiate wind
Trailed a pathetic, vengeful wail behind,
When the brave four took courage, shut the light
And genial glow out from the prying night.

Six yet remained; not one essayed to speak;
The silence broken by a stifled shriek
That blanched all lips, and every man upsprung;
Wide to the night the cabin door was flung.

A rude gust quenched our lamp, and darkness gave
To unknown ill the horror of the grave;
A whirring din, a roll like distant thunder,
On coming, as the hills were rent asunder,
And with hushed breath we each the other eyed,
Knowing we faced that awful thing, a slide!

Our world-ward trail was sheltered by a ledge,
(Rising on one side like a rocky hedge,)
That served for shielding some the cabin door,
And as a quaking mass went thundering o'er
Beyond the trail, leaving it bare and steep,
Into a yawning chasm fathoms deep,
Our unbound hearts leaped upwards with a sigh-
For us the King of Terrors had passed by.

The shaft-house from the cabin lay some feet,
Barely five score: but every tempest beat
With cruel fury thro' a small ravine
Across the trail, wholly devoid of screen;
And quite lost now. Instinct our only guide,
We labored blindly, and on either side
A comrade found. These both alive were saved,
The shaft-house walls were whole, the roof had caved
And buried two, quite dead, tho' barely cold-
A sight that cowed the bravest to behold.

Will Clark was but a lad, not yet eighteen;
We knew some household darling he had been;
For he had gentle speech and dainty ways,
Appeared to yearn for our good will and praise,

The other, Jack Monroe, was the reverse:
He sandwiched every sentence with a curse,
Defiant seemed, alike of God and man,
To such extremes his daily actions ran;
Yet strange to say, his friendship for the youth
Was strong as death, and beautiful as truth.

We found his giant body wedged between
The splintered rafters; an effectual screen
From their sharp spears, shielding the tender frame
As oft his tongue had sheltered him from blame;
One great hand held the slender fingers close,
One crouched the head in its last long repose,
And thus they sleep, our pitying hands provided,
Who living, loved, in death were not divided.

THE LA PLATA MINER

20 March 1886

Caught in Snowslides

The Wild Experiences of Letter Carriers in Western Mountains

SILVERTON, Feb. 10--Mail carrying in the mountains is an occupation which men are not struggling very hard to obtain these days, and the postal authorities care little whether a man is a democrat or a republican so long as he manifests a willingness to brave the terrors of the season. The avalanches of the last few days have been more destructive than any known in recent years, and mail carriers arriving here within the past week have had slides down the mountain that might rejoice the heart of a tobogganer, but which will answer for a life time so far as the actual victims are concerned.

A new man, named Cherry, was put on one of the routes the other day, in the place of a carrier who had been injured by falling about 8,000 feet with 200 or 400 tons of snow and ice, and as nothing was seen or heard of him it was supposed that he had gone through. Day before yesterday a party of men who had went out in search of some miners who were supposed to be in danger, saw an object up the mountain side, and after deciding that it was a man they undertook to get near him. As they came within hailing distance they saw it was the mail carrier. He had secured lodgement in the branches of a tree and was hanging on for dear life, although at that time he was nearly exhausted. One of the party asked:

"Are you hurt?"

"No," was the response.

"Then what's the matter?"

"Nothing, only I've got an almighty bad scare on."

"What for?"

"Because I can't move without starting an avalanche. I've tried it forty times, and she begins to slip every time I move."

The men laughed a little at the comical features of the fellow's situation, but knowing too well the dangers of the snow, they tried to coax him down from the tree.

"It's no use," he said. "The moment I move I start a slide. More'n twenty of them have gone whooping by here in the last forty-eight hours. I never saw anything hung on a hair trigger like this before. Don't you go to shaking anything now, or we'll all go down."

In reference to a question as to what he intended to do the carrier said he didn't know, but he knew that he wasn't going to try to crawl out of that. "I ain't no cat," he continued, "and I tell you that a butterfly could do more mischief here now than a train of cars could anywhere else."

After a short consultation the men determined to get him, and one of them volunteered to creep down to him and give him a rope which was to be held by the others. Picking his way slowly over the snow, all the time warned by the mail carrier that he was bound to get the whole party murdered, the rescuer finally reached the tree, and after a good deal of persuasion induced the man to come down and make an effort to escape. The journey back was safely accomplished, and the postman, overjoyed at his good fortune, set out for Silverton with the determination of throwing up his job.

The mail carrier between this town and Ouray, Lum Patterson, came in here the other night, looking as though he had been used as a snow plow on a locomotive. He had been out in the whole of the last storm, during which more than five feet of snow fell in three days. He lost one of his shoes in a slide which came very near being his last, and would have been unable to proceed at all if he had not found a board from a wrecked shanty, with which he had improvised a very respectable snowshoe.

"I never saw the snow so touchy," he said after he had been thawed out and realized that the assembled crowd were anxious to hear some particulars of his trip. "I started half a dozen slides

myself, and that's something I don't often do. Besides these I saw and heard plenty of others. I'll bet that day before yesterday a man who could yell loud could have brought down half the snow on the mountains. It seemed to hang just right, and the least movement would set it going. I got out of the way of a slide Tuesday afternoon in a pretty slick way. I heard it coming and my first thought was that I was a goner, but just then it occurred to me that if I skipped straight ahead at right angles with the coming sweep I'd have a chance of getting out of its reach. It was all done in a minute. I gave a jump and another and another, and almost before I could breathe she came crashing by me. I believe it took the buttons off my coat tails, but if it didn't it was a great oversight. Nothing of that kind had ever happened to me before, and as soon as I could get my nerves settled I jumped up to take my bearings, when blamed if I didn't start another one which tangled me up in great shape, but which didn't last long or amount to much, as it soon ran into the course of the other and let me out without doing much damage. It was in that one though that I lost my shoes."

Speaking about the miners who winter in their cabins along his trail, Patterson said: "A good many of them are down at the bottom, I'm afraid, but I found one outfit who thought they had themselves insured against slides. They are in a very exposed place, and if they ever get agoing they'll think there's no end to it. When I came along the other day I stopped in awhile to rest and asked the boys if they weren't afraid of the slides. They just got up and took me up the mountain a ways, and pointed out a barricade that they had made. It consisted of logs well anchored, and about six feet high, joined in the shape of a V with the point up, and it is a pretty sharp point, too. 'Now,' says one of the boys, 'if a slide ever starts up above she's bound to go to pieces the minute she strikes this fortification and pass by on both sides of us.' I asked them if they had ever run foul of a snowslide, and they said no, and then I said I thought so, too. I guess I worried them a little, but they are satisfied and I can't help it. But let me tell you, if a slide ever strikes that heap of timber it'll go end for end as quick as a wink, and the miners won't be a second behind the logs in getting to the bottom."

One of the mail carriers in the San Miguel district, George Winders, had a remarkable experience last week. He had been out in the great storm, and as nothing had been heard from him he was given up as lost. He came into Telluride on Saturday in a sadly disabled condition, made his report and said:

"I've got another mail carrier out here."

"Out where?" asked the postmaster.

"Out in the sleigh that I came in with from Haskett's. Come and see him. Perhaps you know him."

Going out to the sleigh the mail carrier threw off a blanket that covered the box and there lay the skeleton of a man with a mail sack strapped to it, the bones and the sack being covered with ice and snow. A large crowd assembled, and in response to their inquiries, Winders said:

"Just the other side of Haskett's I was struck by the edge of a tremendous avalanche and carried down with it. As soon as I could realize what had happened to me I found myself covered with snow, but as luck would have it, I was able to fight my way out. When I had freed myself I saw what I supposed was my sack lying near me, and started to pick it up, when I found that it was frozen hard, and that something was attached to it. Just then I saw my own sack, and for a moment I was more dumbfounded than I had been when the avalanche struck me. I got my own bag, and then I examined the other. As I pulled it out I found this skeleton, and that's all I know about it. It must have come down from above."

Nobody in the vicinity could recall the disappearance of a mail carrier but it was decided that the remains were those of some poor fellow who must have met death in the line of duty during the great storms of two years ago. The sack, still intact, was sent to Denver.

INSTITUTE OF ARCTIC AND ALPINE RESEARCH
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