Snow? Who Knows.

When a Pacific low battles an Arctic front, the result—snow—is hard to predict.

Researchers are starting to understand the factors that conspire to produce historic snow events in the western lowlands. In the following pages, Paul Dorpat chronicles some of the all-time “big snows.”

The challenge of forecasting snow in the Pacific Northwest differs greatly depending on where you are, says Cliff Mass, atmospheric sciences professor at the University of Washington. In the western lowlands of the Pacific Northwest, we get a lot of weather that’s warm and wet. Occasionally, says Mass, we have cold and dry. But what’s difficult to have at the same time is cold and wet: the recipe for snow.

Snow is rare in the coastal areas because the prevailing winds bring relatively warm air from the Pacific Ocean over the region. The air off the Pacific typically is about 45° to 50° F, explains Mass—relatively warm compared to the much colder temperatures of the interior air masses, which can filter through passages like the Fraser Valley in British Columbia and the Columbia Gorge between Washington and Oregon.

Mass has worked over the past two decades to better understand the factors that lead to snow events in the western lowlands. He categorizes them into three basic scenarios.

The “classic snow event” occurs when a cold, high pressure air mass is parked over the Northwest interior, and a low pressure system approaches the coast at about the latitude of the Columbia river.

by Deborah Illman
Our Mediterranean of the Pacific

by Paul Dorpat

"CHAPTER I — BELIEVE IT OR NOT!... Seattle has been visited by a gale so strong that it blew seven railway cars off a trestle into the bay, has had a snowfall six and a third feet deep, has seen a winter temperature of four degrees below zero and a summer heat of 114 degrees in the shade."

Believe it? Most likely, the school children who read of these sensations on the first page of the 1936 Seattle School District #1 little book on Seattle history did believe it.

The author, local theatre critic J. Willis Sayre, managed to accumulate between its orange covers a delightful horde of community trivia. Some came from the usual sources, but much of it was strange and not attributed—like "114 degrees in the shade."

In chapter 13 of This City of Ours, Sayre reveals that the record heat was reached in June 1866, a quarter century before any official meteorological records were kept in Seattle. Almost certainly this statistic is shadier than the shade within which it was recorded.

The coldest day, however, probably dropped on Seattle during what pioneers unanimously called the "big winter" of 1861-62. Arthur A. Denny, "the Father of Seattle," recorded a low that was two degrees warmer than Sayre's.

But that is quibbling. They agree upon the year. In his "Pioneer Days on Puget Sound," Denny writes that he "carefully observed my thermometer and the lowest point reached by my observation was two degrees below zero."

Feed was exhausted, and statewide there was "a great and general destruction of live stock."

The "Big Snow" of January 1880 was also well described by locals, and there are at least six surviving photographs. The pio-

Cold air is drawn through the Fraser Valley, while moist ocean air moves up and over the cold air, dropping its precipitation as snow.

The second recipe for snow derives from a phenomenon called the Puget Sound convergence zone, in which an northerly flow of air off the ocean splits, moving around the Olympic mountain range in opposite directions. The two flows collide roughly in the area of central Puget Sound, often between Everett and Seattle; the air is forced up and drops its moisture under unstable weather conditions that can produce thunderstorms. In the snow scenario, cold air moves in aloft over the region, and then a cold, unstable northerly flow sets up the convergence zone effect. The resulting precipitation then takes the form of flakes.

It was this second scenario that caused the infamous thundersnow of December 1990 that caught forecasters and city officials off-guard.

"I got it wrong too," admits Mass, grinning. "This one really tricked us." The sudden snowstorm dumped over a foot of snow in some locations, paralyzing traffic, dropped the temperatures into the teens within a matter of hours, and whipped up a bitterly fierce north wind.

The third category includes the events that start out as snow and quickly turn over to substantial rain. This scenario is similar to the first case, except that a much larger low pressure moves in and pushes out the colder air, replacing it with rain.

It is the nature and location of this
veteran of the Weather Service served up a warm cocoa of statistics for his *Seattle Times* readers: “Based on 56 winters of official records (our) annual winter snowfall is but 11.2 inches. This is less snow than for any place eastward across the continent of the same parallel of latitude... Six winters in the 56 recorded have had no measurable snowfall, only traces... In the 26 winters since the 16-inch fall of Feb. 14, 1923 the average winter snow has been only 6.9 inches.”

Had we wished to join sentiment to his statistics, the weather man might have also listed the seven years Seattle had a white Christmas in the 38 years he worked for the Weather Service: 1909, 1911, 1915, 1916, 1933, 1937, and 1946.

By one newspaper account, the big snow of 1893 began on Jan. 27th and kept up almost steadily dropping 45 inches before it stopped on the 8th of February. On the 3rd of February, a reading of 5 degrees below zero was claimed at Woodland Park on Phinney Ridge in Seattle—that’s a degree colder even than Sayre’s record!—while nearby on Green Lake the ice was six inches thick.

In his book Seattle, long-time Post-Intelligencer contributor Nard Jones notes of the 1893 snow and cold that “it frightened a good many Seattleites nearly to death; they thought the end of the world was on its way and not in accordance with the Bible.” The following fall the world seemed to end again for the religious and secular alike with the great economic panic of 1893. Those “last days” held until 1897.

Although born 22 years after the big snow of 1916, I admit to feeling covered by it. There may have been more cameras in the hands of amateurs than shovels in 1916. The flurry of snapshots of this big snow is astounding. I have exploited them perhaps too often for winter features illustrating how our second greatest snow stopped streetcars, closed schools, libraries, theaters and bridges, clogged the waterfront, collapsed roofs, and—most sensationaly—also the great dome of St. James Cathedral. The peculiarly cold Januay already had 23 inches of snow when on the last day of the month it began to fall relentlessly.

Between 5pm on the first of February and 5pm on the second, 21.5 inches accumulated in the Central Business District at the Weather Bureau in the Hoge Building. This is still a record: our largest 24-hour pile.

At its end, the 1916 snow was a wet snow. Like the storm of late December 1996, the 1916 big snow came to a foul end. Both were succeeded by a mayhem of mud that broke bridges and carried away homes.

If we rate a snowstorm not merely by its depth but also by how it is driven, then we can introduce the blizzard of 1950. It was a concluding irony to meteorologist Fisher’s 1949 sermon on moderation. With a mean temperature of 28.7 degrees, January 1950 was colder than that of 1916. The blizzard blasted in from the ocean on Friday the Thirteenth. It continued through the night and into Saturday while the temperature dropped to 11 degrees. High winds lifted the waters of Elliott Bay onto the Seattle waterfront and the frozen salt water instantly stuck to anything it could reach.

On the first day of February, a Seattle Times reporter noted, “Last month apparently was designed to make the old settlers forget all about the ‘big winters’ of 1916 and 1893.” Supervising district forecaster Tom Jermin consoled, “We should remember that this is only the third extremely cold winter in 60 years.”

This nearly completes the list of the untoward big snows that have been dumped here since the Denny Party first spilled itself on Alki Beach in the fall of 1851.

To the 19th-century winters of 1861-62, 1880, and 1893 we have added the 20th century “Big Snows” of 1916 and 1950. Somewhat timidly, we may wish to add to

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1930 is a likely date for this Green Lake Freeze in north Seattle. The Recreation Center, far right, was constructed in 1929, and the 1930 freeze was one of the very few “modern freezes” when the ice reached the six-inch thickness required for skating. Photo: Courtesy of Lawton Gowey

The grandest casualty to the Big Snow of February 1916 was the Dome of the Saint James Cathedral in Seattle. The heavy wet snow detected a flaw in the iron work of the cupola and sent it crashing. This view looks into the chancel through the hole in the roof. Photo: UW Libraries, Northwest Collection

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The手册中提到的天气因素包括气压，海洋和大陆的相对位置，以及大雪的频率。老一辈的气象学家利用了大量的历史数据来预测未来的大雪。虽然近年来对气象数据的收集和技术的进步使得预报更为准确，但大雪的预测仍然是一个挑战。气象学家会综合考虑这些因素来预测大雪的可能性。