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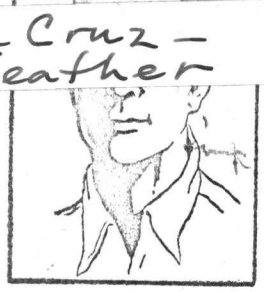


The Curious Riddle Of the Rain

By Harold Gilliam

THE NEW weatherman was mystified.

He had just been transferred to the San Francisco Bay area from an eastern city and was looking over the local rainfall figures. San Francisco's 21 inches of rain seemed reasonable enough, but only a few miles away the figures went into wild variations.

San Rafael, for example, was listed for 35 inches—nearly 75 per cent more rainfall than San Francisco. And Kentfield, only nine miles north of the Golden Gate, showed an unbelievable 46 inches. It seemed evident that somebody had made a mistake in recording.

The weatherman headed for Kentfield to run down the "error," but before he arrived he began to surmise the answer. There, towering over Kentfield and all of southern Marin County, was the long ridge of Mount Tamalpais, rising half a mile into the sky—high enough to pierce the rain clouds and loose tons of water.

Thus the meteorologist learned what any Marin commuter knows by experience—that many a morning he can leave home in the rain, spend a dry day in the city and return home to learn from his wife that it had been raining there most of the time he was gone.

Because of its location at the only sea-level break in the Coast Range—and because of the rugged hill-and-valley topography of the region itself—the San Francisco Bay area probably has a greater variety of weather conditions at any one time than any equivalent area on earth.

The Weatherman's Dilemma

THE RAINFALL peculiarities of any community in the region can largely be attributed to its geographical situation in three respects: its exposure to the ocean, its exact latitude, and its position in relation to nearby hills or mountains.

Half Moon Bay, for example, gets more rain than San Mateo, just over the mountains to the east. Berkeley, directly in the path of storms sweeping in through the Golden Gate, is pelted with nearly one-sixth more rain than neighboring Oakland, partly sheltered from ocean storms by the hills of the San Francisco peninsula.

A community's exact latitude is important because there is normally more rainfall to the north of San Francisco than to the south. The chief reason is the weather phenomenon known as the Pacific High—a semi-permanent high pressure area or "mountain" of air that sits on the water between San Francisco and Hawaii, blocking storms almost as effectively as would a real mountain range. Storms moving around the north end of the Pacific High may hit the coast of Oregon, and often only their southern fringes strike the Bay area. On occasion the Weather Bureau has been able to specify "rain north of the Golden Gate."

As a result, Hamilton Air Force Base, for example, on the shore of the Bay in Marin County, gets nearly one-fourth more rain than San Mateo, also on the shore of the bay some 34 miles south.

The Mountain and the Moisture

THE FINAL consideration affecting Bay area rainfall operates on a smaller scale yet is possibly the most important of all—and also the most confusing. In spite of the fact that in general there is more rain in regions to the north, the southern slopes of any single mountain will tend to get more rain than the northern slopes of the same mountain.

The reason for this paradox has to do with the circular movements of great masses of air. For hundreds of miles around a storm center, the air always circles counter-clockwise. Consequently, as a storm moves in from the ocean to the Bay area, the winds circling around it will come from the south. Watch the flags on San Francisco's skyscrapers; if they are beginning to fly stiffly out toward the north, billowed by a southerly wind, expect a storm within the next day or so.

Umbrellas in Boulder Creek

AS THE CIRCLING air masses hit the southern side of a mountain, they are forced to rise up its canyons and slopes, cooling and losing their moisture in the form of clouds and rain. Normally the heaviest rainfalls in the Bay area occur in the Santa Cruz Mountains where the south winds are caught in the valley of the San Lorenzo River and forced to rise. The town of Boulder Creek tops the region with an average 60 inches.

A single mountain towering high above the surrounding landscape will be able to cause such copious precipitation that the rainfall spills around the sides of the mountain and affects areas some distance away. Thus 2600-foot Mount Tamalpais accounts for the torrential rains of Kentfield northeast of the main peak.

In the immediate Bay area Kentfield holds the precipitation record for a single season. In the winter of 1889-90 the town was deluged with 88 inches of rain. Even San Rafael, more than four miles from the mountain, is strongly affected. If records were kept for areas on the southern slope of the mountain, around Muir Woods, the totals would doubtless be even greater.

On the other hand, a town on the north side of a mountain range is in a "rain shadow," an area sheltered from the rain-bearing south winds. The Santa Clara Valley, almost completely enclosed by hills or mountains on the east, south, and west, is a land of little rain—only 13 inches per year in San Jose. The rain shadow of the same mountains evidently stretches as far north as Palo Alto, which gets only 15 inches as against 21 for San Mateo, just outside the rain shadow to the north.

Within San Francisco itself, official rainfall observations are made in only one place, the Federal Offic Building at the Civic Center. But for the same reason

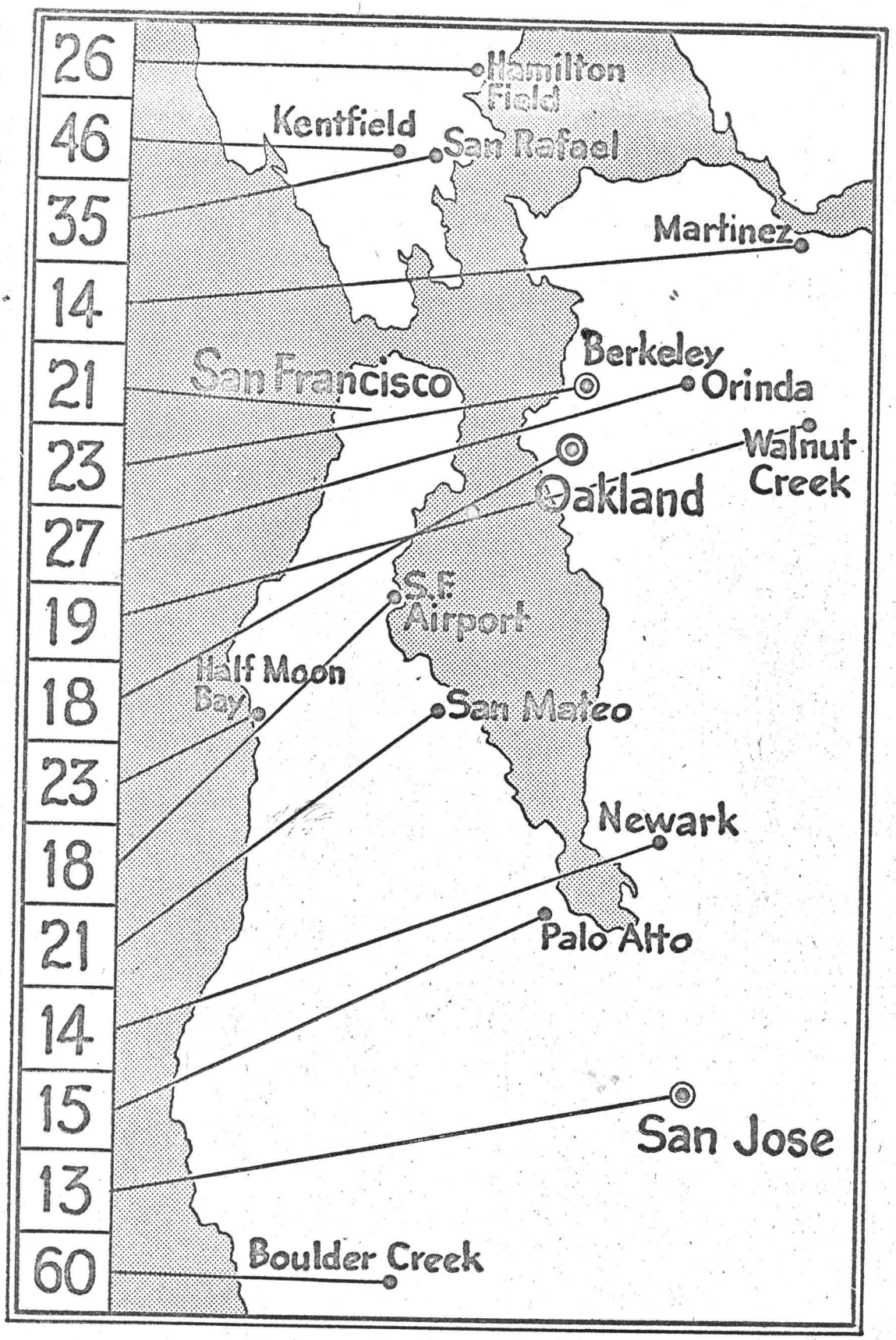
Floods From Waikiki

The rains that came to the Bay area earlier this month, breaking a two-month drought, were mainly from warm Hawaiian storms. Because of the greater capacity of these warm air masses to hold water—and because they may cause rain rather than snow in the Sierra — Hawaiian storms bring the greatest flood danger. It was a series of such storms that arrived just before Christmas in 1955, inundating Yuba City and deluging California with the greatest floods on record.

affecting the Bay area as a whole, there are considerable precipitation variations within the city.

Thus more rain can be expected in the ocean-side Richmond and Sunset Districts than in the hill-sheltered areas east of Twin Peaks; more on the southern slopes of Mount Davidson and Twin Peaks—and perhaps even Nob and Telegraph Hills—than on the northern slopes. The Mission District, in the rain shadow of the hills partly surrounding it, can expect to be drier than the Western Addition or Pacific Heights.

Unfortunately these variations—and similar ones in other parts of the Bay area—have not yet been measured. Consequently, much is still unknown about the Bay area's unique weather patterns. Here is a superb opportunity for students and amateur observers to do pioneering work on an unexplored frontier of knowledge.



The Bay area's average rainfall in inches (left column)