

The other day I went out for a walk just before sunset, on a paved hiking trail and bicycle path that skirts the outer periphery of the place I work (the Sun Microsystems complex at the southwest end of the Dunbarton Bridge). I took an umbrella with me, because there was rain in the area, but it looked as if the nearest shower would pass east of the site, and that in fact happened.

During much of the walk, I had a vast expanse of salt pond immediately west of me. It was calm, so the water was flat. And the shower -- just east of our buildings -- was very local, so that off to the west, in the opposite direction, the Sun was unobstructed as it sank toward the distant hill line of the San Francisco Peninsula.

Conditions were perfect for a rainbow, and I spotted a nice one -- almost a full 180 degree arc, as the Sun was only a few degrees up, and with an extra rainbow outside the main one, concentric with it. The bows were very bright -- strong Sun and a dense shower do that. But there was something more.

The sun was casting a rainbow, and furthermore, the reflected, grazing-incidence image of the sun, reflected by the still waters of the salt pond, was also creating a rainbow of its own. The main, double bow had a geometric center a few degrees below the eastern horizon -- directly opposite the actual Sun, which was a few degrees up in the west. The reflected image of the Sun was a few degrees below the western horizon, in the salt pond, and it was trying to cast a rainbow whose geometric center was a few degrees above the eastern horizon, directly above the center of the two direct-sun rainbows.

The auxiliary bow was not complete, and was not bright enough to have a second, outer bow of its own. The geometry of the two main rainbows -- one from the real Sun and one from its image -- was that of two nearly concentric circles, with centers one above the other, displaced equidistant above and below the horizon. This resulted in the two main bows intersecting at the horizon, with the bow from the real Sun arcing slightly inward therefrom, while the bow from the Sun's reflected image arced slightly outward as it rose up from the horizon.

The auxiliary bow was just as bright as the main one from the real Sun near the horizon, but it faded quickly with

elevation, and had disappeared by the time it had reached ten degrees above the horizon. It took a moment to figure out why: The problem was, that the salt pond wasn't wide enough to produce the whole bow. If you had been standing in the rain shower, looking toward the salt pond, and had gotten a lift straight up via sky hook, then by the time you reached the portion of the shower that was ten degrees up from my position, you would have found that the reflected image of the Sun, in the salt pond, had receded to the far shore of the pond. Hence from that point, there was no reflected solar image to produce the rainbow.

As pilot, astronomer, natural scientist, and student of several outdoor hobbies, I have been watching the sky for more than half a century, and I have never seen this phenomenon before. But given the proximity of water to so many of the settled areas where TACies live, it might be worth keeping it in the back of your mind and looking for it when circumstances permit.

-- Jay Freeman