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February 2023

STAT 490

Cherry Blossom Bloom Day Prediction

I'm writing this introduction without looking at the predictions my model has come up with, but I simply wanted to say for the record that my instincts, all the way back in January, told me that this year's peak bloom would be pretty early compared to previous years. The winter in D.C. this year has been unusually warm, and the mild weather has continued throughout February as well. There are people reporting seeing cherry trees in bloom, even as I write this now. Regardless, this is only my instinct.

Gifted to the United States in 1912 from the People of Japan, The cherry blossom is an iconic flower that is important to Japan and its culture. Known as *Sakura* (桜), this beloved flower has remained a central theme of Japanese art and poetry for centuries, and became a staple in the tradition of *hanami*, or flower viewing every spring. Hanami was started by aristocrats in the Nara period (years 710-794), initially focusing on the Chinese plum blossom before transitioning to the now well established cherry blossom. And while this was an activity reserved for upper-class nobles, as most trends do, the practice trickled down to the lower classes from the Samurai class and eventually to the commoners. Naturally, tourism and festivals would be centered around the actual blooming of the flowers being celebrated, so the practice of predicting bloom is nearly as old as the practice of flower-viewing itself.

The bloom cycle of the cherry blossom tree consists of a hibernation period from fall to winter, where after being exposed to certain low temperatures for a time, it begins to come out of the biological slumber, and proceeds to grow with the increase in temperature as spring comes

closer and closer. The key stage here is the "awakening from hibernation", referred to as dormancy breaking. A warmer winter can actually delay this process, but a warm enough spring can still counteract this effect and make for an early bloom despite the late start.

For a proper bloom, cherry blossoms need both the cold of winter and the warmth of spring. This is why a key variable in predicting the bloom date of cherry blossoms are the low temperatures of the preceding winter.

   With all of that in mind, I made a fairly simple model that predicted a bloom day-of-year of 91 for Kyoto, 89 for Liestal, and 88 for Washington DC, the respective corresponding dates being April 1st, March 30th, March 29th. For Vancouver, the predicted day ended up being 34, February 3rd, which is unfortunately very, very off. In all honesty this model is not the best that it could be. While these predictions don't match my instincts for this year's true bloom date, there are weather reports indicating that a cold spot may hit pretty soon despite the fairly warm weather this winter. And given my research stating that a warmer winter can actually delay the blooming process, I have to acknowledge that a standard or later bloom date may not be so strange or unusual.