

# Autumnal Equinox Fieldwork: Determining True West

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## Introduction:

There are two times a year when day and night are almost equal in length and one of them is the autumnal equinox. During this day, the sun rises due east and sets due west. This makes it a great time to determine true west based on the sunset. The main purpose of this project is to use the position of the sunset on the autumnal equinox (September 22, 2025) to find true west through field observations.

## Experimental Procedure:

I did my observations on Commonwealth Avenue (Com Ave) in Boston, Massachusetts, near the Boston University Bridge. This location was ideal because Com Ave runs almost perfectly east–west. This gave a somewhat built-in directional reference to align with the sun’s setting position.

Field observations were made twice:

- September 8, 2025 – 6:53 pm
- September 22, 2025 – 6:35 pm (the date of the autumnal equinox)

These two observations allowed a comparison of the sun’s position before and on the equinox to determine how closely it aligned with true west.

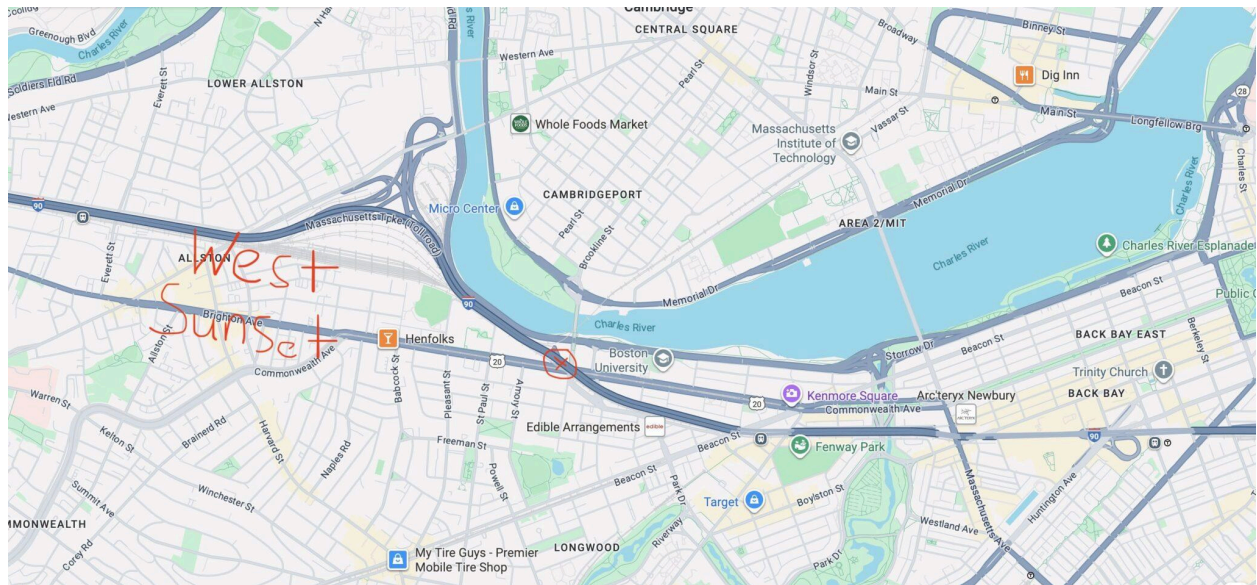
During my field observations:

1. I stood at a fixed position on Com Ave near the BU Bridge, facing west.
2. I used the road’s known east–west orientation as a reference for observing the sun’s setting direction.
3. I took photographs at or near the time of sunset on both observation dates.
4. I annotated a map to indicate the direction of the sun relative to the street grid.
5. I compared the observed sunset positions to determine alignment with true west on the equinox.

## Data:

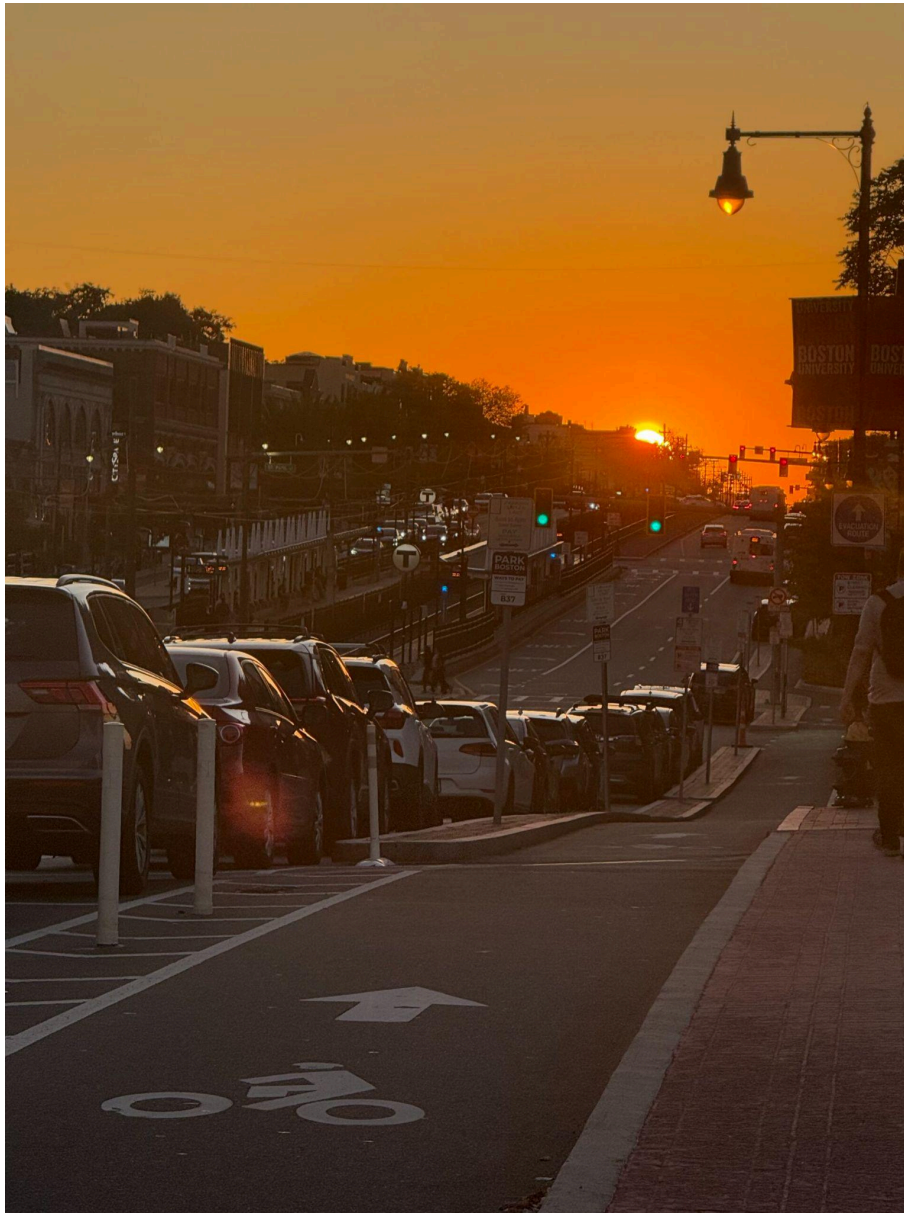
### Annotated Map

The following map shows my observation site and the general direction of the sunset. Commonwealth Avenue runs east-west, and the sun's position aligns with the road.



## Sunset Observation – September 8, 2025 – 6:53 pm

This observation took place about two weeks before the autumnal equinox. The sun appeared to set slightly north of due west, as expected before the equinox, when the sun's path gradually shifts southward each evening. Buildings on the horizon partially obscured the view, causing the sun to appear slightly above the horizon for longer than it actually was. This obstruction may also have affected the perceived timing of the sunset.



## Sunset Observation – September 22, 2025 – 6:35 pm

This observation occurred on the day of the autumnal equinox. The sun set almost perfectly along the western extension of Commonwealth Avenue, closely aligning with true west. The position was slightly more south compared to the earlier observation, consistent with the sun's seasonal shift. The clearer sky conditions and lower horizon visibility allowed for a more accurate observation of the sun's setting point.



## **Data Processing / Analysis :**

By comparing the two observations, it became clear to me that the sun's setting position shifts slightly southward between early September and the equinox. On September 8, the sun set slightly north of due west, while on September 22, it aligned almost perfectly with the westward direction of Commonwealth Avenue. This confirms the equinox principle that the sun sets due west on this date regardless of location.

The results, were influenced slightly by local conditions, including building obstructions and potential small deviations in the street's alignment from true east–west. These factors may have introduced minor observational errors.

## **Conclusion:**

This project successfully demonstrated how the sun's position at sunset on the autumnal equinox can be used to define true west. The two observations show the sun's positional shift over time and also show that its path aligns closely with the westward axis on the equinox.

While in my opinion the results were accurate, I think that there are several improvements that could improve future observations:

- Choose a location with an unobstructed horizon to reduce interference from buildings
- Use a compass to quantify how closely the observed direction matches true west
- Conduct more frequent observations over the two weeks leading up to and following the equinox to capture the sun's movement better

Despite there being improvements if I did this experiment again, my experiment validated the fundamental concept of using the equinox sunset to establish true west and demonstrated the reliability of simple field observation as a scientific tool.