

Ask Mr. Geodesy!

Q. I have a question that has bothered me for years, and decided to Google who to ask, and came up with your names. The question is:

Continental drift separates North America from Europe at a rate of from 1 to 3 inches a year (depending on which source I choose to believe). Our plat map for our lot lists the longitude of the eastern and western corners of our lot. This longitude is keyed to a line in Greenwich England (as I understand as a layman). If this is so, then how does my property line make any sense? In the 16 years I have lived here, it has moved at least 16 inches, and as much as 48 inches. In a century, the movement is considerable (as much as 30 yards!). How do surveyors deal with this?

Where is my legal ownership? Am I slowly owning my neighbor's lot and my other neighbor owning mine?

A. As to how fast plate tectonic motion is separating North America and Europe. The figures will vary a small amount as there no absolute value, but in general a figure of 1-3 inches (3-8 cm) per year is a good ballpark number. The international source for these motions is the [International Earth Rotation and Reference System Service \(IERS\)](#) who are headquartered in Paris. The IERS uses several difference space-based measurement systems to determine and monitor these changes, probably the best know is the Global Positioning System (GPS). I have attached a copy of a map that shows the velocities of permanent GPS tracking stations around the world recently published by the IERS

In the United States there is a Federal agency, the [National Geodetic Survey \(NGS\)](#) that provides some of this GPS data to the IERS. This is done through a network of approximately 1900 GPS [Continuously Operating Reference Stations \(CORS\)](#) managed by NGS. The majority of these CORS shows that the motion of the North American Tectonic plate east of California is moving to the west at approximately 1.5 - 2.0 cm (0.6 - 0.8 inches) per year. If you could provide more specific information about the location of your property I would be able to direct you to the closes one of these CORS to you and show you it's velocity. Many of these CORS have been in continuous operation for more than a decade.

The issue of coordinates and your property is I hope fairly easy to describe. In the United States coordinates rarely, if ever, are the basis for the definition of property boundaries. A coordinate may be used as a piece of reference information but, with only some very modest exceptions, they do not define the property corners. Any coordinates shown on your plate are there for reference purposes only. Property boundaries are defined as being relative to the adjoining parcels and most often the realization of those boundaries is by some form of physical monument such as an iron pipe, a stone, a

concrete monument or sometimes a natural monument such as a tree. Many of us in the surveying community believe that at some point in the future coordinates may ultimately take on a higher place in what is commonly referenced as the "priority of calls" for defining a boundary - but that is well into the future.

All of that being said, there are certain places in the U.S. (i.e. California, western Oregon & Washington) where tectonic events (earthquakes) do from time to time cause disruption in the standard practice of boundary surveys. These are most often addressed by specific state statutes that address these problems.

So the bottom line is that while North America is constantly moving (as is the rest of the planet) the relative relationship of your property to your neighbors remains the same.

Thanks to Dave Doyle for being Mr. Geodesy this week.