By Joel Leininger, LS

Joel Leininger is a principal of S.J. Martenet & Co. in Baltimore and Associate Editor of the magazine.

Retracement Uncertainty Explained

From time to time I am confronted by a layman who expresses surprise that there can be uncertainty in boundary establishments. Invariably, the comment, "I thought surveying was an *exact* science!" will utter forth, accompanied by a glare demanding some kind of explanation. This has happened so many times to me I am persuaded that all surveyors must find themselves in this discussion on occasion. Our role in those conversations begins as a defendant of sorts, but can be leveraged into that of an educator. Here is how I approach the response, and I'd be delighted to hear other approaches from you.

There are three elements likely contributing to boundary uncertainty; we shall explore them in turn.

> **"Perfect operators must be hired in the next life, because none will be found in this one."**

Measurements

First, there is no such thing as a perfect measurement. Measurements are only approximations of "true" values, a fact known by scientists since before Newton, but largely forgotten among the general population. All experiments dependent on measured observations are tainted by the error (however small) of the measurement itself. We surveyors labor under identical constraints. Perfect instruments are beyond our ability to fabricate, and perfect operators must be hired in the next life, because none will be found in this one. Brand-new, precise work should be *really*, *really* close, but will still fall short of error-free.

Our difficulties today pale in comparison to the difficulties on these points endured by our predecessors, however. Instruments of just a couple of decades ago were many times harder to use than today's dreamboats, and operational difficulty usually encourages operator error. Instruments of a hundred years ago or more bear only the slightest resemblance to their descendants. (Somehow we tend to forget this. I once was involved in a debate with a mathematician surveyor who argued that given the specifications for an old survey – instrument type, operator expertise, weather, etc.– a valid positional tolerance could be computed for the older work. Pause. Well, *duh*!, but when is that data ever available in the real world?? We are lucky many times in being able to read the metes and bounds description at all, let alone knowing the make and model of the chain used.) Taking into account the obstacles inherent in using their tools, it is remarkable that surveyors of old did as well as they did. And now for the juicy part: *those surveys conducted by imperfect surveyors using those imperfect instruments still control many modern boundaries.* Oops! Element Number One.

Obliteration

Second, physical remnants of the original surveys disappear over time. These remnants, relied upon by the courts and others (because of having encountered the effects of Element Number One above), consisting of stones, pipes, trees, etc. will not remain in place indefinitely. Although the primary threat to guard stakes may be ten-year-old boys, all physical objects placed on the land are at risk for disturbance, if not obliteration. Trees die, monuments get graded out, roads fall into disuse and disappear. The use and occupation of property itself threatens the status quo, part of which is the marker either left by or observed by our predecessors. The legal safety net of monuments has one gaping hole: over time, they *will* disappear. Element Number Two.

Third, retracement surveyors generally are deprived of much of the relevant writings necessary to overcome the effects of Elements One and Two. Although at first glance this would seem a corollary to those elements, the unavailability of records itself contributes in a separate manner to the problem. Here is how: it is the rare surveyor who will cease work because he does not have enough information to fully determine the boundary location. Surveyors in this situation make the best

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of it, and fill in any remaining blanks by way of the Rules of Construction, or using whatever other lights by which they are guided.

Recently a surveyor in my acquaintance decided to proceed on a boundary retracement of a 120-year-old property, intending to rely primarily on a site plan of the land prepared by others in the 1960s. The problems with such an approach are legion, not the least of which is the distinct possibility that the site plan itself was not the result of an actual retracement survey, but was a compilation of some sort. (Further, even viewed in the kindest light, the 1960s survey would have been subject to Elements One and Two and would have had the added burden of not being "the act" of anyone in the chain of title. In that sense, it can only be viewed as unratified.) For our purposes here, focus on the subsequent effects of the new survey: in the event that it leaves any residue (markers on the ground, record plats, written descriptions incorporated into agreements, etc.), future surveyors of the property will have an additional level of complexity to overcome, stemming from the survey's flawed, but probably unreported, premise. Multiply that by hundreds of thousands of surveys per year, and the problem begins to take on proper proportion.

Uncertain Times

So the apparent unavailability of actionable data contributes separately to present day uncertainty. I suspect that some areas of the country are better on this point than others, but all locations potentially are susceptible to surveyors unwilling to properly research. Element Number Three.

The combination of these Elements results in the situation we have today: retracement uncertainty. Although we have little control over much of that situation, it is useful to recognize that it exists, and to understand where our actions can exacerbate the problem. We have previously explored in this space the concept of "defensible retracement," which is a direct consequence of this uncertainty, and which can be defined as that retracement able to withstand scrutiny by the courts or others, in light of the boundary doctrines applicable. Only when our work can pass that test do we fulfill the office society vests in us.