September 2016

Dear Clients and Friends:

From the time we first learn to count, we realize numbers are organized in multiples of ten, which is called the "decimal system." All of our landmark numbers, like a hundred, a thousand, a million, are multiples of ten. We can write every number using just ten characters, zero through nine.

Before we settled on the decimal system, another number was competing with ten to become our counting base. That number was twelve. The hours on a clock go from one to twelve, there are twelve months in a year, twelve signs of the zodiac, twelve inches in a foot, and many items are counted by the dozen. In the 1500s, it took twelve British pence to equal a shilling, and twelve French deniers to make a sou. The same was true of many other monetary systems, going all the way back to when coinage was in its infancy.

When Philip II introduced bimetallic coins in classical Greece, the ratios between denominations were based on twelve. In commercial transactions, and particularly with weights and measures, fractions of twelve are easier to calculate. Philip's son, Alexander the Great, later switched to the decimal system to unify monetary policy throughout his empire. But the idea of base twelve keeps popping up, even today.

There are several good reasons for changing the way we count. If we had twelve fingers instead of ten, we would probably be using the "duodecimal system." There are groups of mathematicians around the world who are pushing to convert to this method, which they're now calling the "dozenal system." Children would learn to count this way: zero, one, two, three, four, five, six, seven, eight, nine, dek, el, do (pronounced "dough").

The written numbers in base twelve are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, $\mathcal{X}$, $\mathcal{E}$, 10. Twelve is written "10," because there's one "twelve" and no "ones." Thirteen would be written "11." Twelve times twelve is one hundred forty-four, so that number is written "100," representing one "twelve times twelve," no twelves and no ones. By comparison, in base ten, when we write "100" we mean one "ten times ten," no tens and no ones, or one hundred. That either makes sense or your head is starting to hurt.

It only sounds strange because this is not the way we learned to do math when we were kids. Many calculations become simpler with the dozenal system. Using base twelve,

the fraction one-third would be "0.4" instead of "0.3333...," and one-fourth would be "0.3," not "0.25." One-sixth becomes "0.2," much easier to deal with than "0.1666..."

Also, there are useful repetitions and patterns when counting in base twelve, which don't occur the same way using the decimal system. Strange but true, it would actually be easier for children to learn to count and do math in the dozenal system.

If you'd like to watch an entertaining YouTube video comparing the dozenal and decimal systems, google "base 12 numberfile." It's the first video that comes up.

Despite its merits, the dozenal system of weights and measures was dealt a death blow in 1791, when it was formally abandoned by France during the French Revolution. In its place, the new government adopted the metric system, a way of measuring weight, distance and volume using base ten. The French went absolutely crazy with the idea, trying to sweep away all the trappings of the old monarchy. For a while, they even experimented with a decimal time system, where you'd have one hundred minutes in an hour, ten hours in a day, and ten days in a week.

That didn't catch on. However, most of Europe soon followed the conversion to metric. Since then, the rest of the world has come on board, except for the United States.

Few Americans know that in 1975, Congress passed the Metric Conversion Act, signed into law by President Gerald Ford. We were going to make the transition as a country, and in 1976, elementary and high school teachers were passing out new metric rulers to their students. The effort petered out for a variety of reasons, and in 1982, the Reagan administration disbanded the U.S. Metric Board. We've never looked back.

That's the story of how ten edged out twelve, how the rest of the world bought into metrics, and how in America we just don't want to give up those last two donuts.

Regards,

Charles M. Shackelford