DSA Newscast

Dactylonomy, Part II

The Dozenal Society of America is a voluntary, nonprofit educational corporation, organized for the conduct of research and eduction of the public in the use of dozenal (also called duodecimal or base twelve) in calculations, mathematics, weights and measures, and other branches of pure and applied science.

As promised in our last issue, this month we will discuss the many various ways in which we finger-count in our current decimal system. Given that we're all counting to the same number with the same digits, these methods are surprisingly diverse.

The DSA is an international organization; however, since it is the Dozenal Society of *America*, we will begin with the American practice. In the United States, finger-counting is more or less universal, and more or less also very simple. We proceed by starting from a closed fist, and then counting to one by using the index finger. We then proceed with the middle finger and index for two, then add the ring finger for three, the little finger ("pinky") for four, and finally add the thumb for five. This is repeated on the other hand to reach ten; we seldom use our fingers to go beyond this.

Continental Europe counts quite similarly, but rather than starting with the index finger, they start with the *thumb*. The thumb is one; the index finger is added to make two; the middle finger for three; the ring finger for four; and finally the pinky for five. This is repeated on the second hand to ten; seldom does anyone go higher than ten.

Thus far the methods are unremarkable. However, when we reach Asia, things become interesting. We will begin with Japan. There, finger-counting proceeds almost the perfect opposite of the European practice. We begin with an *open* hand,

with all fingers and thumb extended. "One" is an open hand with thumb retracted; two, retract also the index finger; three, retract also the middle finger; four, retract the ring finger; and five, retract the pinky finger, leaving a closed fist.

In China, an even more interesting system prevails, in which one can count from 0 to ℥ using just one hand. Zero is simply a closed fist, and 1–2 are as in the American system. ℈ is the middle, ring, and little finger up, with the thumb and index finger retracted. Four is all fingers with the thumb retracted. Five is all fingers and the thumb extended. For 6–℥, the system diverges a bit, but one of the most common is as follows. Six is the thumb and little finger extended. Seven, the thumb touching the index finger, which is lined up with the other fingers, the whole hand point toward the side. Eight is a finger-gun, the index pointing forward and the thumb upward. Nine is the index finger crooked at the middle. Finally, ten is either a closed fist (also a zero) or the index fingers of both hands crossed. Wikipedia has some instructive images to elucidate these hand positions.

In Korea, the system of *chisanbop* was invented in the 1150s and 1160s, and requires a table to be done properly. Fingers may be on the table or off the table, and in either case the thumb may be down or up. We start with zeroes, which is all fingers and thumbs off the table. One is the index finger down, all others up. Two is the index

and middle down, all others up. Three is the index, middle, and ring down. Four is all four fingers down, thumb up. Five is the thumb down, all fingers up. 6–9 are identical to 1–4, except that the thumb is down rather than up.

Chisanbop increases its range, though, when the left hand is added. The left hand represents tens, the right ones. In this way, all numbers 0–99. can be counted out on the fingers. Representing numbers this way also allows the fingers to serve as a makeshift abacus.

These systems of finger-counting are culturally very ingrained; for example, an American seeing a European count "1" with his thumb will typically be quite thrown off, and Yutaka Nishiyama (http://www.osaka-ue.ac.jp/zemi/nishiyama/math2010/finger.pdf) noted the confusion that resulted when he, a native Japanese, attempted to buy one item from a French store in Paris by gesturing "1" in his accustomed way.

Sometimes, the chosen method of finger-counting can be much more than a bit of cultural shock.

Nishiyama also recounts the tale of some Japanese girls hiding in India during the Second World War. India being a British possession, these girls attempted to pass themselves off as Chinese; an Englishman tested this claim by demanding that they count up to five on their fingers, and their true nationality was found out.

And yet this remarkable variation is only that which exists *today*; in the past, even more interesting systems existed. Probably the most elaborate arose in medieval Europe, where erudite monks, having taken vows of silence, found themselves forced to communicate in truly ingenious gestural systems. The best-documented is that of the Venerable Bede.

Bede was a voluminous writer. One of his more curious works is *De computu vel loquela digitorum*, "On the calculation or speech of the fingers," which gives (according to Bede) "the greatest ease in computation." A visual representation of his system can be found here:

http://www.laputanlogic.com/articles/2004/05/11-0001.html

Amazingly, the system does not even require any remarkable digital dexterity. It relies on a series of extended and curled fingers combined in various ways with a thumb circled or not circled, and extends to ↊10,000 when using both hands. It would doubtlessly take some time to become truly facile with such a system, but it does go to show that finger-counting, even in so clumsy a base as ten, can be remarkably flexible.

And, interestingly, when we consider these many forms of finger-counting, we realize that they are *all* base ten. That makes sense; we have ten fingers. (Though, in fairness, no less a mind than Thomas Leech noted that we really only have eight *fingers*, plus two very different digits; http://www.dozenal.org/drupal/content/dozens-vs-tens.) But, as in counting, we can finger-count in many different bases. Next month, we will investigate the possibilities of finger-counting in various bases other than twelve, before closing in on our real objective: how ought we to finger-count in twelves?

Society Business

Editor of the *Bulletin* Resigns

With great sadness, we share with the Society the news of the resignation of our *Bulletin*'s editor, Michael deVlieger (#37↋). Mike took the helm of both the Society, as its president, and the *Bulletin*, as its editor, in 11↋4 (↊2008), and brought our long-running flagship publication to new heights of both content and design. The press of personal business has rendered him unable to continue in his duties, and therefore he has decided to relinquish the reins.

Mike's brilliance in this role will be sorely missed. He will continue to serve the Society as a member of the Board.

Nevertheless, the Society and the

Bulletin march on. Secretary Jen Seron (#3↋2) has agreed, with assistance from Mike, to take up the design issues for the immediate future; John Volan (#41↋8) will be the new content editor. Gene Zirkel (#67), who has served in nearly every position in the Society, has often stated that the two most important offices in the Society are the treasurer and the editor of the *Bulletin*; we thank Jen and John for being willing to take on this burden.

Default Digits

For our last two issues, we've noted that the former Editor of our Bulletin, Michael deVlieger, has proposed that the Society change our "default" numerals from the traditional Dwiggins (which they have been for over half

our history) to the Pitman digits (long used by the Dozenal Society of Great Britain). The primary reason against this change is tradition, and the primary reason for it is the imminent inclusion of the Pitman characters in the Unicode standard.

We've asked our members to let us know; first by writing in, and then by voting on our website. We've received very few of either. So, in the interests of getting a more representative sample of opinion, we will be leaving the voting site up for one more month. If you'd like to vote, visit it here:

http://www.dozenal.org/drupal/content/transdecimal-characters

Further, to help inform our members, we are publishing the following two statements defending each of the

two choices: Gene Zirkel (#67) in favor of retaining Dwiggins, and Donald Goodman (#398) in favor of adopting Pitman.

ZIRKEL FOR DWIGGINS

"The DSA does *not* endorse any particular symbols for the digits ten and eleven. For uniformity in publication we use Dwiggins χ for ten and ϵ for eleven. Whatever symbols are used, the numbers 'ten', 'eleven' and 'twelve' are 'dek', 'el' and 'do' (pronounced 'do') in the duodecimal system."

The above statement has appeared in our Bulletin many times over the years. It was started by our founders and has served us well over for almost 6 dozen years. Tradition is important, but it is not cast in stone. However, it does deserves serious consideration.

At one point in our history we thought that the phone companies addition of the asterisk and the octothorpe to our phones would make those symbols more popular with our readers, but we were wrong and so we reverted back to Dwiggins.

(Regrettably, due to lack of available fonts, I have used the Greek letter chi for the Dwiggins digit ten. —Ed.)

GOODMAN FOR PITMAN

Tradition does indeed deserve respect, especially a tradition that has sustained our Society and served it well for nearly six dozen years, even when so many had pronounced us doomed and gone.

There can be no doubt that Dwiggins is one such tradition. However, times have changed enough that we must now change with them; and that means changing to Pitman.

Nearly everything we do these days is done on computers. But computers don't care about what characters look like; they care only about encodings. For a long time there were many competing encodings; but now there is really only one, Unicode. This is the encoding of the future.

And Unicode uses (or shortly will use) Pitman.

In 11ε9, Karl Pentzlin submitted a proposal to encode both the Dwiggins and the Pitman characters in Unicode. But the proposal was only partially accepted, with the Pitman characters being encoded in U+218A and U+218B; they should be included in Unicode 8.0 in June of this year, 11εε (at least, according to Wikipedia on "Duodecimal"). Dwiggins was not included.

This means that, in time for the year 1200 (𝖽2016), we will finally have universally (or nearly so) recognized dozenal characters at a commonly accepted code point. Our computer programs can recognize these are numerals and categorize them accordingly. Font designers could begin to design dozenal characters matching the style and feel of their fonts. But those characters will be Pitman.

Unicode is the future; that means that Pitman is the future.

TAX ISSUES

We apologize to our membership for the recent kerfuffle about our status as a 501(c)(3) tax-exempt organization. In December, as reported in this *Newscast*, we received a letter from the IRS indicating that our status had been reinstated. However, a concerned member noted to us that the IRS website was still listing our status as revoked. Out of an abundance of caution, we decided to notify our membership that our status was revoked until we found out definitively otherwise.

The IRS eventually informed us the following day that we had in fact been reinstated, but that their computer system had for some reason failed to update to reflect that status. We were told that it would be so updated in four to six weeks. We will still be listing ourselves as *not* a 501(c)(3) organization until the computer system has updated, in order to avoid this sort of back-and-forth in the future.

We hope that this incident has not adversely affected any of our members.

Again, we are sorry for all the confusion.

DOZENAL NEWS

RATIONALITY, BY TROY

The DSA is pleased to announce the availability of another great dozenal work, this time by long-time DSGB stalwart Donald Hammond, writing under the pseudonym "Troy":

http://www.dozenal.org/drupal/content/rationality

This work explains how "Rationality," understood as the proper use of ratios in mathematics and measurement, facilitates the use of numbers in everyday life. He explains how the "troy" system (dozenal; named, of course, after the troy pound of twelve ounces) is more efficient in most applications than decimal, and proposes an interestingly different version of the protractor. The discussion of kitchen weights and bricklaying are particularly interesting.

DOZENAL PI DAY

"Math geeks" have long enjoyed the celebration of Pi day, 3/14 (so-called because these are the first three digits of π in decimal, 3.14…). Of course, in dozenal we have a superior representation of π, 3;1848…; this translates to

March 18 (March d20), which has been informally celebrated as Dozenal Pi Day.

Unfortunately, we let this holiday escape us with barely a mention this year. Next year, however, is the year 1200 (d2016), and Dozenal Pi Day seems an excellent way to help get out the word in the 60th anniversary of the Society and the last year of this biquennium.

Do you have any ideas how to celebrate? Let us know; send an email to someone on the board, and we can brainstorm about how to take advantage of this auspicious day.

We also have the potential of celebrating a dozenal Phi Day. Phi, or ψ, is the digital expansion of the Golden Ratio, 1;74ᘓᘓ... It has the unique property that $\frac{1}{\psi} = \psi - 1$, so its reciprocal is 0;74ᘓᘓ... In decimal, it is 1.618 and 0.618, which allows celebration on June d18; but the dozenal expansion doesn't work so directly, since there is no July 74. If you have suggestions on a way to calculate a dozenal Phi Day, please let us know.

POETICAL DIVERSION

Tell me not, Ten, I am unkind,
    That from thy two and five,
and from thy hold on mankind's mind
    to dozenal I fly.
True, with another now I soar,
    the greatest base of all:
the Dozen, with two, three, and four,

    stands ever strong and tall.
Yet this new love is a love such
    as I cannot ignore;
I could not love thee, ten, so much,
    loved I not Dozen more.

From Richard Lovelace's immortal poem *To Lucasta, going to the Wars*.

DONATIONS

Members, please remember that while dues are no longer required for membership, we still rely on the generosity of members to keep the DSA going. Donations of any amount, large or small, are welcome and needed.

A donation of $10; ($12.) will procure Subscription membership, and entitles the payer to receive both a digital and a paper copy of the *Bulletin* if requested. Other members will receive only a digital copy. To invoke this privilege, please notify the Editor of the Bulletin, Mike deVlieger, at

mdevlieger@dozenal.org

As members know, we are a volunteer organization which pays no salaries. As such, every penny you donate goes toward furthering the DSA's goals.

It may be worth considering a monthly donation; say, $3, or $6, or whatever seems reasonable to you. This can be set up quite easily with Paypal or WePay, both of which are available at our web site.

Of course, if you prefer to donate by check, you may send them

to our worthy Treasurer, Jay Schiffman, payable to the Dozenal Society of America, at:

Jay Schiffman
604-36 South Washington Square, #815
Philadelphia, PA 19106-4115

Remember, too, that the DSA will likely soon be a 501(c)(3) tax-exempt organization; when this happens, your contributions will be tax deductible under applicable law.

FOR SALE

The DSA is pleased to offer the following for sale. These are all either at cost, or the proceeds go to the Society.

Item	Price ($)
Wall Calendar for 11ᘓᘓ, coiled binding	10.05
Weekly Planner for 11ᘓᘓ	8.29
TGM: A Coherent Dozenal Metrology	8.00

Prices are, unfortunately but by necessity, in decimal. To find these works, simply go to:

http://www.lulu.com/shop/shop.ep

and enter the appropriate terms. E.g., searching for "11EE" will turn up these calendars and the planner; searching for "TGM dozenal" will turn up the TGM book.

We hope to offer other titles, and even some other items (such as dozenal clocks and the like), in the near future.