DSA Newsrast

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In this issue . . .

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.

Dactylonomy, Part III

The easiest non-decimal base in which we can finger-count is *binary*; easiest both because it is the simplest base, and because fundamentally our fingers can be considered as having two states, up or down. Either up or down can be considered "on" in binary; for our purposes, we will consider a finger up to be "on" and down to be "off."

The method is simple: starting from one side of the hand (which side is entirely arbitrary, but the thumb seems to be the most common), each finger is treated as a binary digit. So a closed fist is 0; the thumb only is 1; thumb down and pointer up is 2; both thumb and pointer up is 3; middle finger only is 4; middle and thumb is 5; middle and pointer is 6; middle, pointer, and thumb is 7; ring only is 8; and so forth. Each finger increases the possible range of counting by another power of two; so using our fingers in this way gives us a scope of 2^{σ}, or 714 (d1024); quite impressive, given the simplicity of the method.

If we consider that eight of our digits (all but the thumbs) can be bent in more than just two ways, we can use them for a *ternary* system. Rather than the bits (binary digits) of the binary method, each finger represents a ternary digit which can be 0, 1, or 2. So a closed fist is 0; the pointer half-raised is 1; the pointer fully raised is 2; the middle half-raised with the pointer down is 3; the middle half-raised with the pointer half-raised is 4; and so on. Since we have eight fingers, we get a range of 3^{8}, or 3969 (d6561) in this way; and if we include our thumbs, which can be tricky given their length, we have 3^{σ}. or $2\sigma209$ (d59049).

Already, we are reaching scales that are unlikely to be practically useful; but as an academic exercise, exploring these questions can be quite interesting.

As we get to higher bases, perhaps ironically the range of our counting tends to decrease; this is because . Take, for example, counting in *quinary*, base 5. Only the most dextrous of digital acrobats could hope to use each finger as a quinary digit. No, we must utilize multiple fingers to represent each digit; and thus the system becomes significantly more complex. Whereas with ternary we can reach the remarkable number of 3968 (even without the use of the thumbs), with decimal we can only manage a paltry 84. (True, Bede's system allowed d10,000; but it wasn't really a base system, more akin to Roman numerals than to a positional notation.)

So let's examine the simplest means of counting in quinary: each of our fingers, excluding the thumb, on one hand serves as the first quinary digit, and the second hand serves as the second quinary digit. This allows us to count to a measly 21 (with all eight of our digits up). We can improve things slightly if, like the Korean *chisanbop*, treat the thumb as an extra bit;

We could certainly do better than

this if we got creative with the signs; but with a simple positional system, such as we saw with binary and ternary, we simply can't manage any better.

Let's skip ahead, then, and see *decimal*, base ten. Most simply, we have the many finger-counting systems that we've already looked at in Part II: these typically allow us to count to 𐅵 only if we are using both hands. The Korean *chisanbop* system improves our range here somewhat by *mixing* quinary and decimal. Considering the thumb as equal to a quinary "1" when it is down, the system uses one hand to count to 𐅵, then the other to give us an additional decimal digit. This gives us two full decimal digits, allowing us to count to 8_4 (↊100).

Fundamentally, we are limited in our finger-counting, regardless of base, by our *biology*. There are a few lucky people who are born with six functional digits on each hand; but the vast majority of humanity has just eight fingers and two thumbs to work with. For the very small bases, like binary and ternary, our individual digits are dextrous enough to allow each finger to serve as a position; going higher than that, though, requires us to use multiple physical digits to represent single digital places, which limits our range.

So does our biology favor any higher-order bases besides decimal? In particular, what methods are available for finger-counting in dozenal?

Society Business

The Duodecimal Bulletin: Publishing Schedule

Our new Editor of the *Bulletin*, John Volan (#418), hopes to be able to release two issues of the *Bulletin* this year, one (whole number 𐅶2) on or before June 26 and one (whole number 𐅶3) on or before December 1. If members, or anyone else, have articles they would like to submit, please forward them to us. Our *Bulletin* is only as good as the articles in it; our membership, without doubt, has a great deal to contribute to it.

New Address for DSA

The DSA now has a new "official" address:

13510 Photo Drive
Woodbridge, VA 22193

Correspondence not intended for a particular board member or officer should be directed here.

Dozenal News

DSA Interviewed for Radio Program

Christopher Intagliata of Newsworks has produced an interesting program entitled "10, 50, 100: Why do we find comfort in round numbers?" A significant part of the program concerns alternate bases, and both Gene Zirkel (#67) and Donald Goodman (#398) were interviewed as part of his research. The Society has rarely been able to garner this sort of mass media attention (outside of the kerfuffle immediately following 10 December 1↊8), so we are very excited by this opportunity, and grateful to Newsworks for being willing to cover the topic.

http://www.newsworks.org/index.php/thepulse/item/80394-10-50-100-why-do-we-find-comfort-in-round-numbers

The Society is mentioned in the program, which offers a lot of interesting thoughts on what makes a number "round" and why we prefer our numbers that way. It talks fairly extensively about non-decimal bases, particularly twelve, offering statements from Society members and non-members about twelve's many virtues. We encourage everyone to listen, and perhaps to contact Mr. Intagliata to thank him for remembering such an important part of number theory.

New Article: *The Duodecimal System of Notation* by L. H. Vincent

We are pleased to announce the publication of a new article by L. H. Vincent, *The Duodecimal System of Notation*:

http://www.dozenal.org/drupal/content/duodecimal-system-notation

This is a remarkably readable introduction to the dozenal base, very simple and very light on mathematics. Amazingly, the author explains and defends dozenal with only a single, small table. The comparison of various numbers to the members of a royal court is particularly amusing.

Dozenal Image by Sean Hartung

Member Sean Hartung (#429) has put together and sent us a fascinating image combining a number of dozenal facts and figures into an appealing whole.

Click for Full-size Image

The image unites color, radians, unciaPis (a TGM unit of angular measure), musical notes, and the angles of a triangle into a single display. Well done, and thanks to Mr. Hartung for sharing it with us.

The Great Pitman Debate

As noted in our last issue, we have been running a poll of the membership concerning our "default" set of dozenal digits: should we retain our Dwiggins numerals, or switch to Pitman? We did not initially set any time limit on the poll, which in retrospect was a mistake; however, since we have to put an end to it sometime, now seems as good a time as any. The online poll is now over; here are the results:

	Votes	Perbiqua
Dwiggins	28	54;22%
Pitman	33	67;12%
	5Ɛ	100%

As can easily be seen here, it was a close race, but Pitman did edge out Dwiggins. We also received some letters; all of these but one were in favor of Pitman.

However, the question is not yet decided. Ultimately, of course, the Board must vote. In the interim, though, the new Editor of the *Bulletin* will be soliciting member opinions in the next issue, in the hopes of garnering responses from those who aren't active online.

Thanks to everyone who gave us their opinion.

Poetical Diversion

As once man huddled in the dark, afraid
and cold, no fire to give him warmth or light;
deep in a cave, the sun outside so bright,
but with his back unto the door he stay'd,

watching the shadows of the things outside,
imagining that what he saw was true,
discussing how they movĕd fro and to,
not knowing that he saw but specters glide.

So for so many years has Decimal reign'd,
the hateful Ten, by which we make our count
and measure up our distance, weight, amount,
and even keep Arithmos tightly chain'd.

For even Number was by Ten defin'd;
those which fit into tens he called "round",
ignoring Three and Eight and Nine, so bound
by this cold shadow, Ten, was mankind's mind.

But just as man, when once he turn'd around
and saw the objects which the sun's great light
had cast the shadows which his former sight
had thought to be the truth, the real truth found,

that all the shadows were but ghostly fakes,
mere images, resembling what's outside,
and holding up themselves, with hateful pride,
as being true and good for their own sakes;

So also Twelve, the Dozen, shines out bright,
and casts aside the shadows of the Ten,
and strikes down all imposters, giving men
the eyes to see true Number in the light;

so also Twelve, the Dozen, holds its court,
and all the numbers to it homage pay;
and great Arithmos, bowing low, doth say,
from all his mightiness and great import,

that Twelve, the Dozen, stands above them all,
divisor perfect, and itself sublime,
abundant, governing e'en decimal time,
and e'en among the Tens stands great and tall.

O Twelve, O Dozen, teacher of the true,
the nature of the numbers, giving light;
may we remember that you gave us sight,
and always render unto you your due!

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.

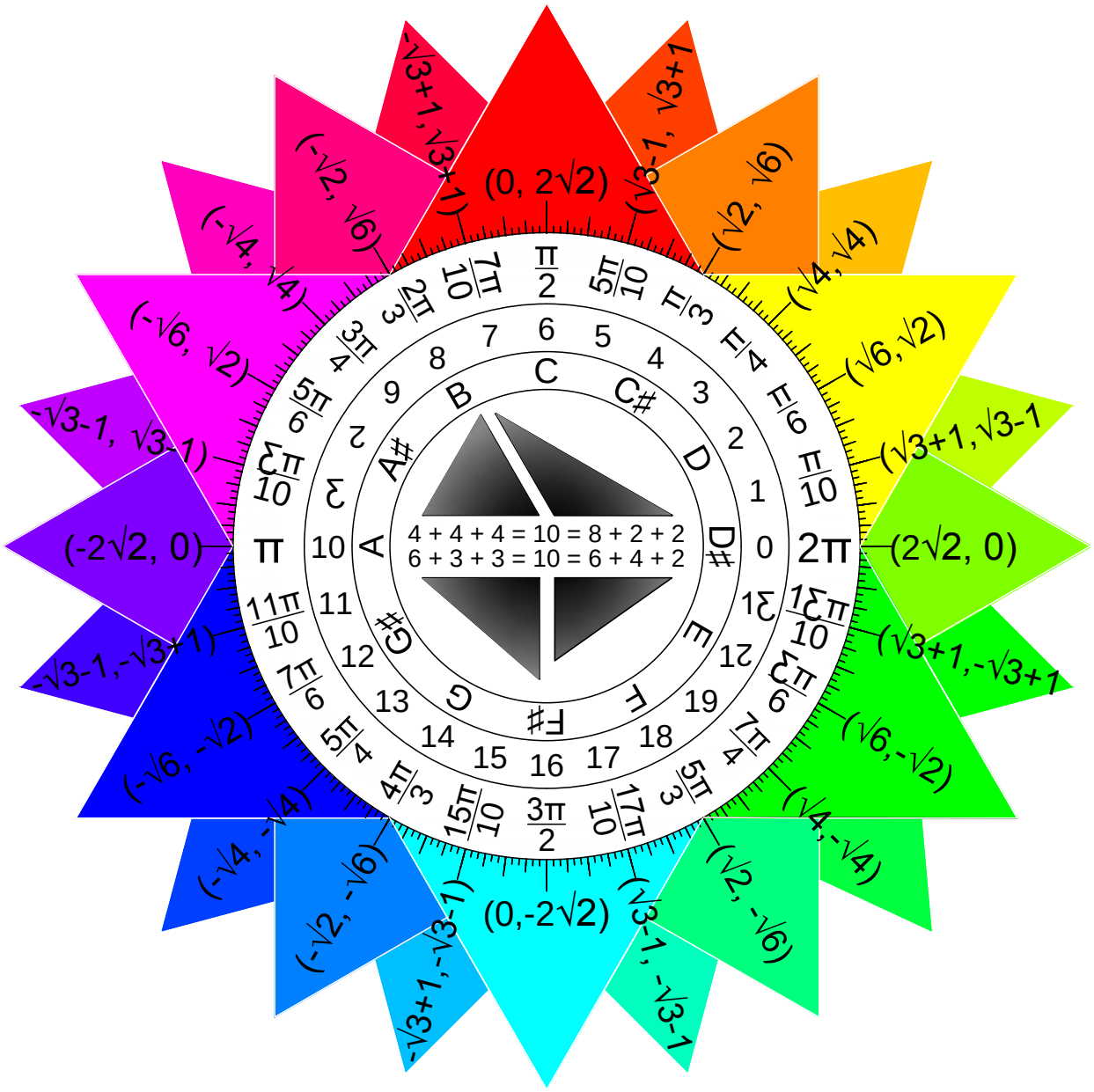
Item	Price ($)
Wall Calendar for 11ℰℰ, coiled binding	10.05
Weekly Planner for 11ℰℰ	8.29
TGM: A Coherent Dozenal Metrology	8.00

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.



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