The Primel Metrology

by John Volan

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Primel is a coherent, dozenal-metric, day-gravity-water-based metrology (system of measurement). I named it "Primel" because it would be the first (i.e., *prime*) metrology to make use of *quantitels*, a set of neologisms I invented to systematically provide generic names for all coherent units of measurement: e.g. **prime·timel** (abbreviated ⊡tmℓ), **prime·lengthel** (abbreviated ⊡lgℓ), **prime·massel** (abbreviated ⊡msℓ), etc., where **prime·** is Primel's "brand prefix," and ⊡ is Primel's "brand mark."

I first began devising Primel back in 11↋8$_z$ (2012$_d$).[2] At the time, I had just learned about Tom Pendlebury's Tim-Grafut-Maz (TGM) metrology,[3] and was very impressed with what he had accomplished with it. However, some of the specific choices Pendlebury had made seemed unsatisfying to me. I wanted to see what sort of system of measurement one could derive by applying many of the same principles embodied in TGM, but starting from a slightly different set of initial conditions.

This article provides a brief overview of the main Primel units for mechanics and temperature, with particular attention on the nomenclatures and stylistic features Primel uses. Future articles may go into greater depth about specific topics.

A Coherent Dozenal-Metric "DGW" System

Primel, like TGM, is a *dozenal-metric* system, in the same way that the International System of Units (SI) is a decimal-metric system. Primel regularizes its units around dozenal as its base of numeration, just as SI regularizes its units around decimal.

Primel is also like TGM and SI in strictly adhering to the principle of *coherence*[4] in measurement systems. That is, it strives to maintain simple one-to-one dimensional relationships between the coherent units it defines for different kinds of physical quantity, avoiding as much as possible any arbitrary factors between coherent units.

Finally, like TGM, Primel is a *day-gravity-water (DGW)* system. It derives its coherent units of measurement from what I like to call certain "mundane realities" of human life on Earth:

- First Mundane Reality: The Mean Solar Day. A dozenal fraction of the mean solar day becomes Primel's coherent unit of time, the **prime·timel**.

[1] https://dozenal.org/duodecimal-bulletin-0A3

[2] This article annotates dozenal numbers with subscript "z" and decimal numbers with a subscript "d". See https://dozenal.org/article-volan-base-annotation-schemes.

[3] See *TGM: A Coherent Dozenal Metrology, based on the system and booklet by Tom Pendlebury, DSGB, updated and revised by Donald Goodman, USA* at https://dozenal.org/article-goodman-tgm-coherent-dozenal-metrology.

[4] See https://en.wikipedia.org/wiki/Coherence_(units_of_measurement).

- Second Mundane Reality: Earth's Gravity. A representative value for the acceleration due to Earth's gravity becomes Primel's coherent unit of acceleration, the **prime·accelerel**. This is used to derive Primel's coherent unit of velocity, the **prime·velocitel**, and then its coherent unit of length, the **prime·lengthel**; and from there coherent units of area (**prime·areanel**) and volume (**prime·volumel**), and all the other units of kinematic mechanics.

- Third Mundane Reality: The Density of Water. A representative value for the density of water becomes Primel's coherent unit of density, the **prime·densitel**. This is then used to derive Primel's coherent unit of mass, the **prime·massel**; and from there, coherent units of momentum (**prime·momentumel**), action (**prime·actionel**), force or weight (**prime·forcel** or **prime·weightel**), energy or work (**prime·energel** or **prime·workel**), power (**prime·powerel**), pressure (**prime·pressurel**), and all the other units of dynamic mechanics.

- Fourth Mundane Reality: The Specific Heat Capacity ("Massic Heatability") of Water. A representative value for the massic heatability of water becomes a coherent unit in its own right, the **prime·masselic·heatabilitel**. This is used to derive Primel's coherent unit of temperature, the **prime·temperaturel**, and then all the other units of thermodynamics.

- There are additional "mundane realities" for other branches of physics (to be discussed in future articles).

The table on page 3_z shows a representative sample (by no means exhaustive) of Primel's coherent units and how they derive from the above selections.

Pendlebury called these "fundamental realities," but in my view that is too grandiose a characterization, because it implies that these are somehow related to "universal" or "fundamental" constants of physics. In actuality, Primel's "realities" tend to be ordinary facts of life for human beings living on Earth. Thus I prefer calling them "mundane." This still implies that they pertain to the "whole world" (Latin *mundus*), but more specifically the *human* world. That said, one can certainly construct metrologies based on more "universal" constants, and can use metrology features like quantitels to that end, but such systems are more appropriate for niche branches of extreme physics, rather than everyday usage. The intent for Primel is to be a *practical* system, rather than a "universal" one.

Over the years, I have striven to consolidate the best ideas I could find from past dozenal metrologies, while also trying to prune out practices that I felt were contrived or pretentious or otherwise counterproductive, as well as to invent nomenclature and systematization where needed to enrich the metrology-building process, but with a flexible enough structure that people could inject their own favorite cultural elements into their own systems. I have helped other members of the DozensOnline forum[5] explore many variations on this style of measurement system, including regularizing around their own preferred bases other than decimal or dozenal.[6] My intent throughout was to make these elements available as generic reusable tools for the benefit of anyone wanting to experiment with new systems of measure.

Diverging from Pendlebury

Even though Primel follows a similar "DGW" derivation pattern as TGM, Primel diverges from TGM in some of its specific selections. My primary difficulty with TGM was that Pendlebury elected to divide the day in *half* first, before starting to divide it dozenally. This happens to yield the familiar customary hour as

[5] `https://www.tapatalk.com/groups/dozensonline/index.php`

[6] For examples, see "Day Gravity Water System" spreadsheet at `https://dozenal.org/resource-volan-dgw-spreadsheet`.

Primel ⊡ Selected Mechanical and Thermodynamic Units				
Quantity	Quantitel Form and Abbrev	Colloquial and Abbrev	Derivation	SI and USC Equivalents
Time	**prime·timel** ⊡tmℓ	**prime·vibe·time** ⊡vb·tm	hexcia·day	$0.042_z = 0.02893\overline{518}_d$ s
Acceleration	**prime·accelerel** ⊡accℓ	**prime·gravity·acceleration** ⊡grv·acc	Earth gravity at $34°01'34.56''_d$	$9.79651584_d \frac{m}{s^2}$ $32.1408_d \frac{ft}{s^2}$
Velocity Speed	**prime·velocitel** ⊡vcℓ **prime·speedel** ⊡spdℓ		⊡accℓ×⊡tmℓ	$0.283464_d \frac{m}{s}$ $1.0204704_d \frac{km}{h}$ $0.93_d \frac{ft}{s}$ $11.16_d \frac{in}{s}$
Length Height Width *etc...*	**prime·lengthel** ⊡lgℓ **prime·heightel** ⊡hgtℓ **prime·widthel** ⊡wdℓ *etc...*	**prime·morsel·length** ⊡mo·lg **prime·morsel·height** ⊡mo·hgt **prime·morsel·width** ⊡mo·wd *etc...*	⊡vcℓ×⊡tmℓ	$8.20208\overline{3}_d$ mm 0.3↊6$_z$ = $0.32291\overline{6}_d$ in
Area	**prime·areanel** ⊡arℓ	**prime·morsel·area** ⊡mo·ar	⊡lgℓ^2	$67.2741710069\overline{4}_d$ mm^2 $0.1042751736\overline{1}_d$ in^2
Volume	**prime·volumel** ⊡vmℓ	**prime·morsel·volume** ⊡mo·vm	⊡lgℓ^3	0.551788356779_d ml 0.111949104137_d tsp
Density	**prime·densitel** ⊡dsℓ	**prime·water·density**	water density at 4°C	999.972_d kg/m^3
Mass	**prime·massel** ⊡msℓ	**prime·morsel·mass** ⊡mo·ms	⊡dsℓ×⊡vmℓ	0.551772906706_d g 0.019463216516_d oz
Momentum	**prime·momentumel** ⊡mmℓ	**prime·morsel·momentum** ⊡mo·mm	⊡msℓ×⊡vcℓ	$15.6407755_d \frac{g \cdot cm}{s}$ $1.56407755 \times 10_d^{-4} \frac{kg \cdot m}{s}$
Action	**prime·actionel** ⊡actℓ	**prime·morsel·action** ⊡mo·act	⊡mmℓ×⊡lgℓ	$12.8286944_d \frac{g \cdot cm^2}{s}$ $1.28286944 \times 10_d^{-6} \frac{kg \cdot m^2}{s}$
Force	**prime·forcel** ⊡fcℓ **prime·weightel** ⊡wtℓ	**prime·morsel·force** ⊡mo·fc **prime·morsel·weight** ⊡mo·wt	⊡msℓ×⊡accℓ	0.5512027063908_d g_f 5.40545202062705_d mN
Energy Work	**prime·energel** ⊡ngℓ **prime·workel** ⊡wkℓ	**prime·morsel·energy** ⊡mo·ng ⊡morsel·work ⊡mo·wk	⊡fcℓ×⊡lgℓ	44.3359679275_d μJ
Power	**prime·powerel** ⊡pwℓ	**prime·morsel·power** ⊡mo·pw	⊡ngℓ÷⊡tmℓ	1.53225105157502_d mW
Tension	**prime·tensionel** ⊡tsℓ	**prime·morsel·tension** ⊡mo·ts	⊡fcℓ÷⊡lgℓ	$0.659034028422907_d \frac{N}{m}$
Pressure	**prime·pressurel** ⊡psℓ	**prime·morsel·pressure** ⊡mo·ps	⊡fcℓ÷⊡arℓ	80.3495894444997_d Pa
Heat	**prime·heatel** ⊡htℓ	**prime·morsel·heat** ⊡mo·ht	⊡ngℓ	44.3359679275_d μJ
Massic Heatability	**prime·masselic·heatabilitel** ⊡msℓ\htbℓ		slightly above water average	$4198.76286389748_d \frac{J}{kg \cdot K}$
Heatability	**prime·heatabilitel** ⊡htbℓ	**prime·morsel·heatability** ⊡mo·htb	⊡msℓ\htbℓ × ⊡msℓ	$2.31676358998144_d \frac{J}{K}$
Temperature	**prime·temperaturel** ⊡tpℓ	**prime·morsel·temperature** ⊡mo·tp	⊡htℓ÷⊡htbℓ	19.1370272388791_d μK

Primel ⊡ Selected Powers of the Prime·Timel				
Quantitel Form and Abbrev	Colloquial and Abbrev	Rationale	Derivation and Abbrev	SI and USC Equivs
prime·hexqua·timel ⊡h↑tmℓ	**day** dy	Mundane reality of the mean solar day	day dy	$42{,}000_z = 86{,}400_d$ s $↊00_z = 1440_d$ min
prime·pentqua·timel ⊡p↑tmℓ	**prime·dwell·time** ⊡dw·tm	How long sun "dwells" in a "house," astrological term for uncia·turn of sky	uncia·day u↓dy	$4200_z = 7200_d$ s $↊0_z = 120_d$ min 2 hr
prime·quadqua·timel ⊡q↑tmℓ	**prime·breather·time** ⊡br·tm	Time enough for a short rest from work,"taking a breather"	bicia·day b↓dy	$420_z = 600_d$ s $↊ = 10_d$ min
prime·triqua·timel ⊡t↑tmℓ	**prime·trice·time** ⊡tr·tm	Archaic term for a short duration; pun on dividing the day "thrice"	tricia·day t↓dy	$42_z = 50_d$ s
prime·biqua·timel ⊡b↑tmℓ	**prime·lull·time** ⊡lu·tm	Time for long, embarrassing pause	quadcia·day q↓dy	$4.2_z = 4.1\overline{6}_d$ s
prime·unqua·timel ⊡u↑tmℓ	**prime·twinkling·time** ⊡tw·tm	Time for an eye blink	pentcia·day p↓dy	$0.42_z = 0.347\overline{2}_d$ s
prime·timel ⊡tmℓ	**prime·vibe·time** ⊡vb·tm	Short for "vibration." Period of note $C\sharp_0$, at threshold of audibility	hexcia·day h↓dy	0.042_z s $0.02893\overline{518}_d$ s

a primary unit, and then fractional dozenal powers of the hour, ultimately leading to the quadcia·hour (10_z^{-4} of an hour) as Pendlebury's coherent unit of time, the Tim (equivalent to 0.21_z or $0.1736\overline{1}_d$ seconds).

Pendlebury took his selected value for Earth's gravity, the Gee, as his coherent unit of acceleration. Multiplying a Gee by a Tim yields Pendlebury's coherent velocity unit, the Vlos. Multiplying the Vlos in turn by a Tim yields his coherent length unit, the Grafut, or "gravity-foot." The Grafut is a fair approximation of the customary foot in the United States Customary (USC) and British Imperial (BI) measurement systems. This made TGM rather attractive to members of both the Dozenal Society of Great Britain (DSGB) and the Dozenal Society of America (DSA).

But if TGM aspires to be a *dozenal*-metric system, on the assumption that dozenal is the "best" base, then why should it inject a digit of *binary* base right at the beginning of its derivation? TGM ostensibly considers the mean solar day a "fundamental reality," yet the mean solar day itself is not a whole dozenal power of the Tim. Instead, the *hour* is. This seems an unnecessary sacrifice of principle just for the sake of keeping one familiar clock unit. It also means an awkward division by two when switching between time measured in days and time measured in Tims.

In contrast, Primel divides the mean solar day in strictly dozenal-metric fashion, the way the founding members of the DSA did for their Do-Metric System.[7] Primel, in fact, selects the hexcia·day (10_z^{-6} of a day) to be its coherent **prime·timel** (abbreviated ⊡tmℓ), equivalent to 0.042_z or $0.02893\overline{518}_d$ seconds, 6 times smaller than the Tim. Since the day is a dozenal power of the prime·timel, the transition from counting times-of-day to counting whole days is a simple shift of the radix point.

The prime·timel itself may seem to be a dauntingly small time unit to base a metrology on, being well beneath human perception. That said, there are certainly applications for precision timing down to the prime·timel or even finer. Sports events such as the Olympics often use stopwatches to record athletic times down to the hundredth of a second, which is almost three times finer than a prime·timel. However, dozenal scalings of the prime·timel provide more convenient units for practical everyday use. (The table on page 4_z shows Primel's dozenal divisions of the day, which are all dozenal scalings of the prime·timel.)

[7] Or, as I have fancifully re-imagined it, their "Uncia·Metric" system. See article on Do-metric in *Duodecimal Bulletin*, Whole Number $↊3_z$ (https://dozenal.org/duodecimal-bulletin-0A3), page 16_z.

Primel ⊡ Speeds on the Road			
Primel Speed	Metric Speed	USC Speed	Possible Usage
10_z ⊡vcℓ	12.2456448_d km/h	$7.6\overline{09}_d$ mph	
20_z ⊡vcℓ	24.4912896_d km/h	$15.2\overline{18}_d$ mph	school zone speed limit
30_z ⊡vcℓ	36.7369344_d km/h	$22.8\overline{27}_d$ mph	
40_z ⊡vcℓ	48.9825792_d km/h	$30.4\overline{36}_d$ mph	residential speed limit
50_z ⊡vcℓ	61.2282240_d km/h	$38.0\overline{45}_d$ mph	
60_z ⊡vcℓ	73.4738688_d km/h	$45.6\overline{54}_d$ mph	urban arterial road speed limit
70_z ⊡vcℓ	85.7195136_d km/h	$53.2\overline{63}_d$ mph	
80_z ⊡vcℓ	97.9651584_d km/h	$60.8\overline{72}_d$ mph	urban expressway speed limit
90_z ⊡vcℓ	110.2108032_d km/h	$68.4\overline{81}_d$ mph	
↊0_z ⊡vcℓ	122.4564480_d km/h	$76.0\overline{90}_d$ mph	rural freeway speed limit
↋0_z ⊡vcℓ	134.7020928_d km/h	83.700_d mph	
100_z ⊡vcℓ	146.9477376_d km/h	$91.3\overline{09}_d$ mph	autobahn speed

From Gravity to Length

Next, Primel takes Earth's gravity as another "mundane reality," using a candidate value for that as its coherent unit of acceleration, the **prime·accelerel** (abbreviated ⊡accℓ).

I say "candidate" value, because in fact "Earth's gravity" is not a "constant of nature". Instead, gravity on Earth's surface is a somewhat "squishy" quantity, in that it *varies* over a certain range, due to a number of factors, the most significant being the counteracting centrifugal force of Earth's rotation, which causes gravitational acceleration to diminish from a maximum at the poles to a minimum at the equator. But so long as a given choice falls somewhere within this natural range, it's fair game to consider it a candidate for "Earth's gravity." If the utility of the metrology is improved in the process, then such a choice is completely legitimate. The important thing is that a metrology pick some *standard* for measuring acceleration. Then local gravity can be measured and quantified against that standard, and its deviation from that can be factored into physical computations. Gravity is not the only "mundane reality" that is "squishy" in this way, but each such case offers an opportunity to make a metrology more useful.

Multiplying the prime·accelerel by the prime·timel yields the **prime·velocitel** (⊡vcℓ), Primel's coherent unit of velocity or speed. Multiplying the prime·velocitel in turn by the prime·timel yields the **prime·lengthel** (⊡lgℓ), Primel's coherent unit of length.

This explains the need for the prime·timel to be so small. In effect, for any metrology that follows the DGW derivation pattern, its lengthel will be proportional to the square of its chosen timel, with its chosen accelerel as the proportionality constant. Earth's gravity makes for a relatively large accelerel, so in order to maintain coherence, either a timel must be relatively small, or the resulting lengthel will be relatively large, along with all units subsequently derived from it. For Primel, I opted for a small timel.

Remarkably, the **prime·velocitel** is a fair approximation of a foot per second, as well as almost exactly one kilometer per hour. People from metric countries may find Primel speedometers relatively easy to adapt to. (See table on page 5_z for a comparison of typical speedometer values.)

The **prime·lengthel** is about $\frac{1}{36}_d$ or $\frac{1}{30}_z$ of a Grafut, or about a dozenth of a decimeter, or about a third of an inch. This may seem small, but it is on the order of a centimeter in size. Recall that for much of the Nineteenth Century the centimeter proved quite serviceable as the coherent unit of length in the centimeter-gram-second (CGS) system.[8] Furthermore, a third of an inch was actually an archaic English unit of measure

[8] https://en.wikipedia.org/wiki/Centimetre%E2%80%93gram%E2%80%93second_system_of_units

Primel ⊡ Selected Powers of the Prime·Lengthel			
Quantitel Form and Abbrev	Colloquial and Abbrev	Rationale	SI and USC Equivalents
prime·septcia·lengthel ⊡s↓lgℓ	**prime·atomical·length** ⊡ato·lg	Size of an atom	228.90509274_d pm
prime·hexcia·lengthel ⊡h↓lgℓ	**prime·polymeral·length** ⊡pol·lg	Size of large polymer molecule	2.7468611129_d nm
prime·pentcia·lengthel ⊡p↓lgℓ	**prime·somal·length** ⊡som·lg	Size of a ribosome	32.9623333548_d nm
prime·quadcia·lengthel ⊡q↓lgℓ	**prime·luminal·length** ⊡lum·lg	Wavelength range of visible light	395.54800025721_d nm
prime·tricia·lengthel ⊡t↓lgℓ	**prime·chondrial·length** ⊡chn·lg	Size of a mitochondrion	4.7465760031_d µm
prime·bicia·lengthel ⊡b↓lgℓ	**prime·cellular·length** ⊡cel·lg	Size of a eukaryotic cell	$56.958912\overline{037}_d$ µm
prime·uncia·lengthel ⊡u↓lgℓ	**prime·granular·length** ⊡grn·lg	Size of a grain of salt	$0.03\text{↊}6_z$ in $= 26.097\overline{2}_d$ thou $683.5069\overline{4}_d$ □m
prime·lengthel ⊡lgℓ	**prime·morsel·length** ⊡mo·lg	Size of a small bite of food	$\frac{31}{96}_d = 0.3\text{↊}6_z = 0.32291\overline{6}_d$ in
prime·unqua·lengthel ⊡u↑lgℓ	**prime·hand·length** ⊡hd·lg	Approximates customary 4-inch hand	$3\frac{7}{8} = 3.\text{↊}6_z = 3.875_d$ in 0.98425_d dm
prime·biqua·lengthel ⊡b↑lgℓ	**prime·ell·length** ⊡ℓ·lg	Approximates old English ell of 45_d in	$3\text{↊}.6_z = 46.5_d$ in 1.1811_d m
prime·triqua·lengthel ⊡t↑lgℓ	**prime·habital·length** ⊡hb·lg	Size of a house or "habitation"	$3\text{↊}.6_z = 46.5_d$ ft 14.1732_d m
prime·quadqua·lengthel ⊡q↑lgℓ	**prime·stadial·length** ⊡ς·lg	Approximates ancient Greek *stadion*	$3\text{↊}6_z = 558_d$ ft $0.13\overline{2750}_z = 0.1056\overline{81}_d$ mi 170.0784_d m
prime·pentqua·lengthel ⊡p↑lgℓ	**prime·dromal·length** ⊡dr·lg	From Greek *dromos*, "road, racetrack" Good unit for road distances	$3\text{↊}60_z = 6696_d$ ft $1.3\overline{2750}_z = 1.26\overline{81}_d$ mi 2.0409408_d km
prime·hexqua·lengthel ⊡h↑lgℓ	**prime·itineral·length** ⊡itn·lg	From Latin *iter, itineris* "march" Daily march for Roman legion Recommended limit for a modern daily commute.	$3\text{↊},600_z = 80,352_d$ ft $13.\overline{2750}_z = 15.2\overline{18}_d$ mi $24,491.2896_d$ m 24.4912896_d km
prime·septqua·lengthel ⊡s↑lgℓ	**prime·regional·length** ⊡rgn·lg	About the size of a region	$3\text{↊}6,000_z = 964,224_d$ ft $132.\overline{7502}_z = 182.6\overline{18}_d$ mi 293.8954752_d km
prime·octqua·lengthel ⊡o↑lgℓ	**prime·continental·length** ⊡cnt·lg	About the size of a continent	$3,\text{↊}60,000_z = 11,570,688_d$ ft $1,327.\overline{5027}_z = 2191.4\overline{18}_d$ mi $3,526.7457024_d$ km
prime·ennqua·lengthel ⊡e↑lgℓ	**prime·global·length** ⊡glb·lg	A bit more than a global circumference	$3\text{↊},600,000_z = 138,848,256_d$ ft $13,275.\overline{0275}_z = 26,297.0\overline{18}_d$ mi $42,320.9484288_d$ km

Primel ⊡ Selected Powers of the Prime·Areanel			
Quantitel Form and Abbrev	Colloquial and Abbrev	Rationale	SI and USC Equivalents
prime·areanel ⊡arℓ	**prime·morsel·area** ⊡mo·ar		$0.104275173\overline{61}_d$ in^2 $67.2741710069\overline{4}_d$ mm^2
prime·unqua·areanel ⊡u↑arℓ	**prime·stamp·area** ⊡mo·ar	About the size of a postage stamp	$1.25130208\overline{3}_d$ in^2 $8.0729005208\overline{3}_d$ cm^2
prime·biqua·areanel ⊡b↑arℓ	**prime·hand·area** ⊡hd·ar		15.015625_d in^2 0.9687480625_d dm^2
prime·triqua·areanel ⊡t↑arℓ	**prime·lap·area** ⊡lp·ar	About the size of a seated human lap	$1.25130208\overline{3}_d$ ft^2 11.62497675_d dm^2
prime·quadqua·areanel ⊡q↑arℓ	**prime·ell·area** ⊡ℓ·ar		15.015625_d ft^2 1.39499721_d m^2
prime·pentqua·areanel ⊡p↑arℓ	**prime·tarp·area** ⊡trp·ar	Approx size of a painter's dropcloth	180.1875_d ft^2 16.73996652_d m^2
prime·hexqua·areanel ⊡h↑arℓ	**prime·habital·area** ⊡hb·ar	Avg floorspace of new home in US	2162.25_d ft^2 2.0087959824_d are
prime·septqua·areanel ⊡s↑arℓ	**prime·jugeral·area** ⊡jg·ar	Approximates ancient Roman *jugerum*	$25{,}947_d$ ft^2 0.595661157025_d acre $0.241055517\overline{8}_d$ ha
prime·octqua·areanel ⊡o↑arℓ	**prime·stadial·area** ⊡ς·ar		$311{,}364_d$ ft^2 7.147933884298_d acre 2.892666214656_d ha
prime·decqua·areanel ⊡d↑arℓ	**prime·dromal·area** ⊡dr·ar		1029.30247933884_d acre 1.60828512396694_d mi^2 4.16543934910464_d km^2
prime·unnilqua·areanel ⊡un↑arℓ	**prime·itineral·area** ⊡itn·ar		231.59305785124_d mi^2 599.82326627106_d km^2
prime·unbiqua·areanel ⊡ub↑arℓ	**prime·regional·area** ⊡rgn·ar		$33{,}349.400330578_d$ mi^2 $86{,}374.550343034_d$ km^2
prime·unquadqua·areanel ⊡uq↑arℓ	**prime·continental·area** ⊡cnt·ar		$4{,}802{,}313.64760331_d$ mi^2 $12{,}437{,}935.2493968_d$ km^2
prime·unhexqua·areanel ⊡uh↑arℓ	**prime·global·area** ⊡glb·ar		$691{,}533{,}165.254876_d$ mi^2 $1{,}791{,}062{,}675.9132_d$ km^2

known as a "barleycorn."[9] Interestingly, shoe sizes in the United States continue to use this measure for their denominations. So a unit of this size is not unprecedented.

To be more precise, I have carefully selected a very specific value for Earth's gravity: exactly 9.79651584_d meters per second per second, or 32.1408_d feet per second per second (corresponding to a latitude of $34°01'34.56''_d$ or 11.73↊↋566↊$_z$ bicia·turns). This value is within the natural range for Earth surface gravity, but a bit lower than SI's gravity standard (9.80665_d m/s^2 or 32.17405_d ft/s^2). I chose Primel's gravity value in order to make the prime·lengthel come out to *exactly* 0.3↊6$_z$ or $\frac{31}{96}{}_d$ USC inches. Since the USC inch has been defined as exactly 25.4_d millimeters, transitively this makes the prime·lengthel *exactly* $8.20208\overline{3}_d$ millimeters.

[9] https://en.wikipedia.org/wiki/Barleycorn_(unit)

Primel ⊡ Selected Powers of the Prime·Volumel			
Quantitel Form and Abbrev	Colloquial and AbbrevAbbrev	Rationale	SI and USC Equivalents
prime·volumel ⊡vmℓ	**prime·morsel·volume** ⊡mo·vm		0.111949104136604_d tsp $0.551788356779875578\overline{7037}_d$ ml
prime·unqua·volumel ⊡u↑vmℓ	**prime·mascaral·volume** ⊡msc·vm	Size of a cosmetic or perfume tube	0.22389820827321_d fl oz $6.6214602813585069\overline{4}_d$ ml
prime·biqua·volumel ⊡b↑vmℓ	**prime·biberonal·volume** ⊡bb·vm	Size of a baby bottle, from Fr. *biberon*	2.6867784992785_d fl oz $79.45752337630208\overline{3}_d$ ml
prime·triqua·volumel ⊡t↑vmℓ	**prime·hand·volume** ⊡hd·vm		1.00754193722944_d qt 0.953490280515625_d L
prime·quadqua·volumel ⊡q↑vmℓ	**prime·bucket·volume** ⊡bkt·vm	Typical size of a waste bucket	3.02262581168831_d gal 11.4418833661875_d L
prime·pentqua·volumel ⊡p↑vmℓ	**prime·drum·volume** ⊡dm·vm	Typical size of an oil drum	36.2715097402597_d gal 137.30260039425_d L
prime·hexqua·volumel ⊡h↑vmℓ	**prime·ell·volume** ⊡ℓ·vm		435.258116883117 gal 1.647631204731_d m^3
prime·ennqua·volumel ⊡e↑vmℓ	**prime·habital·volume** ⊡hb·vm		3723.875_d yd^3 2847.106721775168_d m^3
prime·unnilqua·volumel ⊡un↑vmℓ	**prime·stadial·volume** ⊡ς·vm		$6,434,856_d$ yd^2 $4,919,800.4152275_d$ m^3
prime·untriqua·volumel ⊡ut↑vmℓ	**prime·dromal·volume** ⊡dr·vm		2.03959795266717_d mi^3 8.5014151175131_d km^3
prime·unhexqua·volumel ⊡uh↑vmℓ	**prime·itineral·volume** ⊡itn·vm		$3,524.425262209_d$ mi^3 $14,690.44532306_d$ km^3

This allows for exact conversions between lengths in Primel units and lengths in both USC and SI units. This then makes it feasible to construct machine tools with relatively simple gear ratios that can precisely manufacture machine parts measured in SI, USC, or Primel units. In an advanced modern industrial civilization, any proposed metrology that did not offer this capability would be at a severe disadvantage. Moreover, scaling up the prime·lengthel by dozenal powers eventually results in units exactly equivalent to whole numbers of USC feet. (See table on page 6_z.)

Another advantage this confers is that the prime·accelerel is closer to the theoretical average value for Earth's gravity integrated over the surface area of the Earth. (DozenOnline forum member Dan has estimated this to be approximately 9.7975827196164_d m/s^2, corresponding to a latitude of $35°17'17.82''_d$ or 12.14731821_z bicia·turns.) SI's standard gravity is *not* an "average" value for gravity on Earth. It is actually an *inaccurate* Nineteenth Century estimate of gravitational acceleration at *median latitude* ($45_d°$ or 16_z bicia·turns, or 1 octant). But parallels of latitude subtend progressively more surface area approaching the equator, so the latitude of the *average* gravity is correspondingly lower. Furthermore, more people live closer to the equator than to median latitude, so using a lower gravity standard actually increases the chances the estimate will match the experience of an average human being.

In contrast, Pendlebury's Gee (9.81005_d m/s^2 or 32.1852_d ft/s^2) is even larger than SI's gravity standard, corresponding to an even higher latitude (about $49°16'05.51''_d$ or 17.70727872_z bicia·turns). He chose that value in order to make a dozenal power of the Grafut exactly equal to ten times the polar diameter of Earth. This was simply in order to be able to precisely specify the Grafut in terms of something which could be measured with extreme accuracy using the technology available during Pendlebury's era. But this consideration has long since become obsolete. Today, it is trivial to specify any length unit using an exact count of caesium transition intervals and the speed of light, both of which are known today with exceeding accuracy.

At this point, you might be questioning whether Pendlebury or I have been "playing fast and loose" with "mundane realities," by picking values for gravity that are convenient for our respective purposes,

Primel ⊡ Selected Powers of the Prime·Massel			
Quantitel Form and Abbrev	Colloquial and Abbrev	Rationale	SI and USC Equivalents
prime·tricia·massel ⊡t↓msℓ	**prime·granular·mass** ⊡grn·ms		$0.319313024714_{\mathrm{d}}$ mg
prime·massel ⊡msℓ	**prime·morsel·mass** ⊡mo·ms		$0.019463216516_{\mathrm{d}}$ oz $0.551772906706_{\mathrm{d}}$ g
prime·unqua·massel ⊡u↑msℓ	**prime·mascaral·mass** ⊡msc·ms	Size of a cosmetic or perfume tube	$0.233558598192_{\mathrm{d}}$ oz $6.621274880472_{\mathrm{d}}$ g
prime·biqua·massel ⊡b↑msℓ	**prime·biberonal·mass** ⊡bb·ms	Size of a baby bottle, from Fr. *biberon*	2.802703178304 oz $79.455298565664_{\mathrm{d}}$ g
prime·triqua·massel ⊡t↑msℓ	**prime·hand·mass** ⊡h·ms		$2.10202738372_{\mathrm{d}}$ lb $0.953463582788_{\mathrm{d}}$ kg
prime·quadqua·massel ⊡q↑msℓ	**prime·bucket·mass** ⊡bkt·ms	Typical size of a waste bucket	$25.224328604736_{\mathrm{d}}$ lb $11.4415629934556_{\mathrm{d}}$ kg
prime·pentqua·massel ⊡p↑msℓ	**prime·drum·mass** ⊡dm·ms	Typical size of an oil drum	$302.691943256832_{\mathrm{d}}$ lb $137.298755921467_{\mathrm{d}}$ kg
prime·hexqua·massel ⊡h↑msℓ	**prime·ell·mass** ⊡ℓ·ms		3632.30331907 lb $1647.58507106_{\mathrm{d}}$ kg

rather than endeavoring to determine the exact "average" gravity, whatever that may be, convenient or not. I would counter that this is an unnecessarily purist notion, and reiterate the reasons I spelled out for picking Primel's gravity.[↊]

Further applying the principle of coherence yields a set of Primel base units that are generally smaller than TGM's units, yet clearly bear a familial relationship to TGM units. When we scale these coherent units by dozenal powers and simple dozenal factors, many of the resulting auxiliary units show striking resemblances to familiar units in both SI and USC.

Quantitels

A *quantitel* is a generic, formal name for the coherent unit of a given type of physical quantity, within some metrology. A quantitel is formed by appending the suffix **-el**, short for "element," onto the name of the quantity itself. In the same fashion that the word *pixel* designates a "picture-element," likewise a **timel** ("time-element"), a **lengthel** ("length-element"), a **massel** ("mass-element"), etc., would be coherent base units of, respectively, time, length, mass, and so forth.

Each quantitel makes it self-evident what type of quantity it measures. Quantitels entirely bypass the practice of using the names of "dead scientists" as "honor names" for units. There is no attendant need to memorize which obscure historical figure was associated with which science and therefore which type of quantity. How many people can instantly recognize that *newtons* measure force, whereas *joules* measure energy, while *watts* measure power? But it would go without saying that **forcels** measure force, **energels** measure energy, and **powerels** measure power.

Moreover, quantitels allow us to supply *every* type of quantity with a serviceable unit name, with minimal effort. They're not limited to just a handful of "fundamental" quantities or to a few "important" quantities deemed worthy of honor names. SI's expedient of referring to so many units via often-unwieldy "derived unit expressions" is a ludicrous deficiency, all the more inexcusable for being so unnecessary.

[↊] "Puritel" (brand mark: □) is an alternative metrology that is just like Primel, except that all of its "mundane realities" are uncompromisingly "pure," i.e., based on the naturally-occurring values. This is included, for comparison, on the DGW spreadsheet (https://dozenal.org/resource-volan-dgw-spreadsheet)

Primel ⊡ Selected Powers of the Prime·Weightel (Prime·Forcel)			
Quantitel Form and Abbrev	Colloquial and Abbrev	Rationale	SI and USC Equivalents
prime·tricia·weightel ⊡t↓wtℓ	**prime·granular·weight** ⊡grn·wt		$0.318983047680_{\text{d}}$ mg$_f$ $3.128155104529_{\text{d}}$ μN
prime·weightel ⊡wtℓ	**prime·morsel·weight** ⊡mo·wt		$0.019443103292_{\text{d}}$ oz$_f$ $0.551202706391_{\text{d}}$ g$_f$ $5.405452020626_{\text{d}}$ mN
prime·unqua·weightel ⊡u↑wtℓ	**prime·mascaral·weight** ⊡msc·wt	Size of a cosmetic or perfume tube	0.23331723950_{d} oz$_f$ 6.61443247669_{d} g$_f$ 64.8654242475_{d} mN
prime·biqua·weightel ⊡b↑wtℓ	**prime·biberonal·weight** ⊡bb·wt	Size of a baby bottle, from Fr. *biberon*	2.79980687401 oz$_f$ 79.3731897203_{d} g$_f$ 778.385090970_{d} mN
prime·triqua·weightel ⊡t↑wtℓ	**prime·hand·weight** ⊡hd·wt		2.09985515551_{d} lb$_f$ 0.95247827664_{d} kg$_f$ 9.34062109164_{d} N
prime·quadqua·weightel ⊡q↑wtℓ	**prime·bucket·weight** ⊡bkt·wt	Typical size of a waste bucket	25.1982618661_{d} lb$_f$ 11.4297393197_{d} kg$_f$ 112.087453100_{d} N
prime·pentqua·weightel ⊡p↑wtℓ	**prime·drum·weight** ⊡dm·wt	Typical size of an oil drum	$302.3791423932_{\text{d}}$ lb$_f$ $137.1568718366_{\text{d}}$ kg$_f$ $1.345049437196_{\text{d}}$ kN
prime·hexqua·weightel ⊡h↑wtℓ	**prime·ell·weight** ⊡ℓ·wt		3628.549708721 lb$_f$ $1.645882462039_{\text{d}}$ Mg$_f$ $16.14059324636_{\text{d}}$ kN

For instance, rather than measure velocity in *lengthels per timel*, you can simply use **velocitels**. Rather than measure volume in *cubic lengthels*, you can simply use **volumels**. Rather than measure momentum in *massel-lengthels per timel* or even *massel-velocitels*, you can just use **momentumels**. And so forth. If you can name the type of quantity you are measuring, you can instantly generate a quantitel for it. If a *new* type of quantity comes along, you can instantly generate a quantitel for *that*. Science has no problem coming up with terminology for the phenomena it studies, so by rights it should be trivial to name the units for measuring said phenomena.

Besides, the choice of which units should be "fundamental" and which should be "derived" is somewhat arbitrary, and can even be a matter of debate. Instead of wasting time and energy on such debates, students of the physical sciences should simply internalize the equations of physical law, and refer to them when they need to do dimensional analysis on their units. If "force equals mass times acceleration" and "acceleration is the second time-derivative of position," then it should be trivial to translate that into "a forcel is a massel times an accelerel" and "an accelerel is a lengthel per timel squared" as needed. But it should not be necessary to declare the dimensional decomposition of a unit every time we make a measurement.

Another point is that we can have synonymous quantitels wherever a quantity can be described with synonymous terms, so long as those terms describe quantities that are truly commensurate. For instance, "width," "height," "breadth," "depth," "distance," "displacement," "position," "altitude" are all quantities commensurate with "length," so **widthel**, **heightel**, **breadthel**, **depthel**, **distancel**, **displacementel**, **positionel**, **altitudel** are all just synonyms for **lengthel**. It is a bit more concise to say that a certain box is "50_z prime·breadthels by 40_z prime·widthels by 30_z prime·depthels," than to say it has "a breadth of 50_z prime·lengthels, a width of 40_z prime·lengthels, and a depth of 30_z prime·lengthels." Since "work" and "heat" are just commensurate forms of "energy," **workel** and **heatel** would be synonyms for **energel**.

Since “weight” is just an example of “force,” **weightel** and **forcel** would be synonyms (but only if the given metrology uses a value for gravity as its **accelerel**).

Sometimes the scientific term for a given type of quantity is already on the longish side, for instance “acceleration” or “momentum.” Strict application of the **-el** suffix to these names can yield correspondingly long quantitels, such as **accelerationel** or **momentumel**. It’s acceptable to truncate such quantitels, without changing their meaning, as long as this doesn’t lead to ambiguity. For instance I have already been referring to the **accelerel**, which can be understood as just a truncated synonym for **accelerationel**. Similarly, **momentumel** might be truncated to **momel**, but perhaps not **momentel**, since this might be confused with the quantitel for “moment.”

As a final note, I did not try to make quantitels linguistically “universal.” They really are intended as English coinages specifically, and not meant to “work” in all languages. *However*, there is no reason they cannot be *translated* into other languages. Each language would take its own native words for physical quantities and amend them with some common particle appropriate in that language to convey the sense of a piece or portion of the given type of quantity. But I leave that exercise to be worked out by native speakers who are more expert in their own respective languages.

Branding

My intent for quantitels was that they would be generic terms reusable across many metrologies. An unadorned quantitel could refer to the abstract notion of a coherent unit, allowing us to make general statements such as, “every DGW system begins by choosing a timel;” or “using a value for gravity as an accelerel makes it almost interchangeable to report massels or weightels when ‘weighing’ something;” or “one energel (as one workel) can raise one massel of water by one heightel (lengthel) against one accelerel, and that same energel (as one heatel) can raise that same massel of water by one temperaturel.” Such statements, and similar ones in preceding paragraphs, can apply to any metrology.

On the other hand, if we qualify a quantitel with a “brand prefix” specific to a given metrology, it becomes the coherent unit for that particular metrology. For instance, we can talk of Primel’s coherent units as the “prime·timel,” “prime·lengthel,” “prime·massel,” etc. When inventing a new metrology, all we need do is come up with a pithy name for the entire metrology. Then we can immediately use quantitels to start discussing and utilizing all its units, and get on with exploring the merits of the metrology itself. This can be a vast time-saver. We need not first engage in some long creative process to find unique names for all of its units, distinct from the units of all other metrologies. (It does not *preclude* such creativity, however. More about that in a moment.)

We can make this even more convenient by choosing a “brand-mark,” a single emoji-like character that can serve as an abbreviation for the brand-prefix within unit abbreviations. For instance, the brand mark I have chosen for Primel is ⚀, Unicode ‘DIE FACE-1’ (U+2680$_x$).[Ɛ]

Under the right circumstances, brand prefixes and brand marks may be omitted. If a given discussion or written work only talks about a single branded metrology, then it could leave out the branding. It could resort to unbranded quantitels and quantitel abbreviations, and these would be understood to be units specific to that metrology. In such a case, it may be helpful to include an up-front statement such as “this document defaults to Primel units.”

On the other hand, whenever any discussion or work compares and contrasts branded quantitels from

[Ɛ] Originally, I picked the prime character (′) as Primel’s brand mark, which may seem the obvious choice. However, compared to brand marks selected for other DGW metrologies, this was rather thin and indistinct. Moreover, it can tend to get lost in other punctuation, making it awkward to discuss Primel units in normal prose. For backward compatibility, the prime character may be considered an alternative, but the die face should be preferred.

multiple metrologies, or uses unbranded quantitels as abstract terms while at the same time using specifically branded quantitels, it becomes necessary to include the branding in order to avoid ambiguity. I am doing both of these things in this article, so I am including branding prefixes and brand marks throughout.[10]

Scaling Prefixes and Colloquial Names

Beyond the coherent quantitels, Primel defines many auxiliary units for each type of quantity. First, it scales its quantitels to any power of dozen, and sometimes to convenient factors of dozen, using the dozenal scaling prefixes from Systematic Dozenal Nomenclature (SDN).[11] These are comparable to the decimal scaling prefixes defined for the metric system, but are much more comprehensive, taking full advantage of the high factorability of base twelve.

Primel also introduces many so-called "colloquial" names for its units, as creative alternatives for the formal names derived from quantitels and SDN prefixes. Each colloquial name attempts to provide an intuitive sense of scale by relating the given Primel unit to some comparably-sized physical object or phenomenon known to human experience, or to some customary or ancient unit that it might approximate. In the latter case, I try to only reuse existing unit names where the approximation is "close" (within $10\%_z$ or so). The closer the approximation, the more justified the reuse is.

Note that Primel's dozenal divisions of the day (see page 4_z) are identical to those the DSA founders identified for their Do-Metric metrology. However, I have elected to offer a completely new set of colloquial names for these divisions. One thing I strive for is to have colloquial names consist of ordinary English words, as much as possible. Portmanteau neologisms tend to be contrived and awkward, so I try to limit my use of them to the brand names of whole metrologies, rather than the colloquial names of numerous units. Unfortunately, the DSA founders seemed to favor portmanteaus. Furthermore, their choices for time units relied too much on references to sexagesimal time and decimal:

- The *duor* is a portmanteau of "double hour," the hour being of course a sexagesimal unit. I suggest the **prime·dwell·time** (⊡dw·tm) instead, an allusion to the time the sun spends each day "dwelling" in each "house" (an astrological term for a $30°_d$ or 1 uncia·turn sector of the sky relative to the observer).[12] Certainly if you engage in some activity for two hours straight, it's fair to say you are "dwelling" on it.☺[13]

- The *temin* is a portmanteau of "ten minutes," the minute being a sexagesimal unit, and "ten" of course being a decimal number. I suggest calling this the **prime·breather·time** (⊡br·tm) instead, an allusion to "taking a breather" as a hiatus from work. In traditional time, the expression "take ten" also has this meaning, but "taking a breather" avoids the decimal/sexagesimal reference.

- The *minette* is a portmanteau of "minute" and the diminutive suffix "-ette," alluding to this as a shorter analog of a sexagesimal minute. I suggest the **prime·trice·time** (⊡tr·tm) instead, where a "trice" is a slightly archaic but otherwise ordinary word meaning a short period, as well as a pun on deriving this unit by "thrice" dividing the day by a dozen.

- The *vic* is a portmanteau of "vibration of C," alluding to the period of a musical note. I suggest **prime·vibe·time** (⊡vb·tm), where a "vibe" is a less opaque way to make the same allusion.

[10] You can see many more examples of metrology brand prefixes and brand marks, for other notional metrologies in a variety of bases, on the DGW Spreadsheet (`https://dozenal.org/resource-volan-dgw-spreadsheet`).

[11] See the SDN Summary at `https://dozenal.org/article-volan-systematic-dozenal-nomenclature-summary`.

[12] This oblique allusion to an astrological term is not necessarily an endorsement of the pseudo-science of astrology. It merely takes advantage of astrology as a fertile source of colorful metaphors, which is the name of the game when trying to coin memorable colloquial names.

[13] Primel does accept the traditional hour as an auxiliary unit, the prime·semi·pentqua·timel, with *hour* as its colloquial name. However, Primel reserves the prerogative to characterize the hour as "half a prime·dwell," rather than the prime·dwell as a "double hour."

- The *grovic* and *dovic* are not even distinct colloquial names, they are just dozenal scalings of the *vic*. I suggest **prime·lull·time** (⊡lu·tm) for the former, where a “lull” is enough of a pause to be embarrassing in conversation. For the latter, I suggest **prime·twinkling·time** (⊡tw·tm), where a “twinkling” is another slightly archaic word for a brief period, and the time to blink an eye.

The Primel colloquials in each of these cases make use of ordinary English words from the dictionary without any contrivance or awkward reference to sexagesimal or decimal. We can actually imagine these terms arising organically, with no prior knowledge of the terminology for sexagesimal time.

Colloquial Families

Note that Primel colloquial names tend to end in a noun indicating the kind of quantity being measured, often the noun from which the associated quantitel is derived. In a context where only one kind of quantity is being addressed, this suffix might be dropped, just as the branding prefix might be dropped under the right circumstances. But retaining the suffix makes it possible to have a series of derivative names.

In many cases, a colloquial name for a length unit can be the basis for an entire family of colloquial names for related units. For instance, the Primel quantitels themselves (see table on page 3_z) form a “morsel” unit series based on the **prime·morsel·length** (⊡mo·lg) as the colloquial for the prime·lengthel (⊡lgℓ):

- **prime·morsel·area** (⊡mo·ar) as the colloquial for the prime·areanel (⊡arℓ);
- **prime·morsel·volume** (⊡mo·vm) as the colloquial for the prime·volumel (⊡vmℓ);
- **prime·morsel·mass** (⊡mo·ms) as the colloquial for the prime·massel (⊡msℓ);
- **prime·morsel·momentum** (⊡mo·mm) as the colloquial for the prime·momentumel (⊡mmℓ);
- **prime·morsel·action** (⊡mo·act) as the colloquial for the prime·actionel (⊡actℓ);
- **prime·morsel·force** (⊡mo·fc) as the colloquial for the prime·forcel (⊡fcℓ), or
  prime·morsel·weight (⊡mo·wt) as the colloquial for the prime·weightel (⊡wtℓ);
- **prime·morsel·energy** (⊡mo·ng) as the colloquial for the prime·energel (⊡ngℓ), or
  prime·morsel·work (⊡mo·wk) as the colloquial for the prime·workel (⊡wkℓ);
- **prime·morsel·pressure** (⊡mo·ps) as the colloquial for the prime·pressurel (⊡psℓ); etc.

Another notable example is the “hand” series starting from the **prime·hand·length** (⊡hd·lg) as a colloquial for the prime·unqua·lengthel (⊡u↑lgℓ). At $3.\text{↊}6_z$ (3.875_d) USC inches, this resembles the customary “hand” unit of 4 USC inches. It also bears a remarkable resemblance to an SI decimeter. The derivatives from this (see table on page 12_z) turn out to be convenient sizes, mitigating the smallness of the “morsel” series:

- Squaring the prime·hand·length yields the **prime·hand·area** (⊡hd·ar), the colloquial name for the prime·biqua·areanel (⊡b↑arℓ = 100_z ⊡arℓ). This resembles a square decimeter.
- Cubing the prime·hand·length yields the **prime·hand·volume** (⊡hd·vm) the colloquial name for the prime·triqua·volumel (⊡t↑vmℓ = 1000_z ⊡vmℓ). This resembles a liter or USC quart.
- Filling the prime·hand·volume with water at one prime·densitel yields the **prime·hand·mass** (⊡hd·ms), the colloquial name for the prime·triqua·massel (⊡t↑msℓ = 1000_z ⊡msℓ). This resembles a kilogram or two pounds.

Primel ⊡ Selected "Hand" Series Units				
Quantity	Quantitel Form and Abbrev	Colloquial and Abbrev	Derivation	SI and USC Equivalents
Length	**prime·unqua·lengthel** ⊡u↑lgℓ	**prime·hand·length** ⊡hd·lg	(resembles customary 4-in hand measure)	0.98425_d dm $3.Ɛ6_z = 3.875\overline{6}_d$ in
Area	**prime·biqua·areanel** ⊡b↑arℓ	**prime·hand·area** ⊡hd·ar	⊡hd·lg^2	0.9687480625_d dm^2 15.015625_d in^2
Volume	**prime·triqua·volumel** ⊡t↑vmℓ	**prime·hand·volume** ⊡hd·vm	⊡hd·lg^3	0.953490280515625_d L 1.00754193722944_d qt
Mass	**prime·triqua·massel** ⊡t↑msℓ	**prime·hand·mass** ⊡hd·ms	⊡hd·vm × ⊡dsℓ	0.953463582788_d kg 2.10202738372_d lb
Force Weight	**prime·triqua·forcel** ⊡t↑fcℓ **prime·triqua·weightel** ⊡t↑wtℓ	**prime·hand·force** ⊡hd·fc **prime·hand·weight** ⊡hd·wt	⊡hd·ms × ⊡accℓ	0.952478276643_d kg$_f$ 9.34062109164_d N 2.09985515551_d lb$_f$
Energy Work	**prime·quadqua·energel** ⊡q↑ngℓ **prime·quadqua·workel** ⊡q↑wkℓ	**prime·hand·energy** ⊡hd·ng **prime·hand·work** ⊡hd·wk	⊡hd·fc × ⊡hd·lg	0.917728023583454_d J
Pressure	**prime·unqua·pressure** ⊡u↑psℓ	**prime·hand·pressure** ⊡hd·ps	⊡hd·fc ÷ ⊡hd·ar	0.964195073334_d kPa

- Multiplying the prime·hand·mass by one prime·accelerel yields the **prime·hand·force** (⊡hd·fc), the colloquial name for the prime·triqua·forcel (⊡t↑fcℓ = 1000_z ⊡fcℓ), or the **prime·hand·weight** (⊡hd·wt), the colloquial name for the prime·triqua·weightel (⊡t↑wtℓ = 1000_z ⊡wtℓ). This resembes a kilogram-force (the weight of a kilogram mass in one gravity) or two pounds-force (the weight of two pounds mass in one gravity).

- Applying a prime·hand·force over one prime·hand·length yields the **prime·hand·work** (⊡hd·wk), the colloquial name for the prime·quadqua·workel (⊡q↑wkℓ = $10{,}000_z$ ⊡wkℓ), or the **prime·hand·energy** (⊡hd·ng), the colloquial name for the prime·quadqua·energel (⊡q↑ngℓ = $10{,}000_z$ ⊡ngℓ). This resembles the joule.

- Dividing the prime·hand·force by the prime·hand·area yields the **prime·hand·pressure** (⊡hd·ps), the colloquial name for the prime·unqua·pressurel (⊡u↑psℓ = 10_z ⊡psℓ). This resembles the kilopascal.

- And so forth.

Similar series of units may be formed from other scalings of the prime·lengthel. For instance, the colloquial name for the prime·biqua·lengthel ($3Ɛ.6_z$ or 46.5_d USC inches) is the **prime·ell·length** (⊡ℓ·lg), because of its resemblance to the old English *ell* (39_z or 45_d USC inches).[14] At 1.1811_d meters or 1181.1_d millimeters, it also resembles the 1200_d mm modular size specified in the ISO-2848[15] standard for modular construction,

[14] I stumbled onto the similarity of the prime·biqua·lengthel to the old English *ell* quite independently, and only later discovered that William S. Crosby, an early member of the DSA, had discovered this same similarity back in 1161_z (1945_d), as a "harried infantryman" in the US Army at the tail end of World War II. See *Duodecimal Bulletin*, Vol. 52_z, No. 1, WN $Ɛ2_z$, page 30_z, https://dozenal.org/duodecimal-bulletin-0A2. Crosby also recognized the similarity of the prime·hand·mass to the kilogram and was advocating it as his massel (though not in those terms, of course). In fact, I credit Crosby with being the first to articulate the notion of deriving a metrology from the day, Earth's gravity, and the density of water, some two unquennia before Pendlebury. Pendlebury clearly acknowledges Crosby in his *Duodecimal Review* article from 1181_z (1969_d), "The Dozen, and Metrology" (reproduced in *Duodecimal Bulletin*, Vol. $Ɛ3_z$, page 24_z, https://dozenal.org/duodecimal-bulletin-0A3). I've included Crosby's system on the DGW spreadsheet (https://dozenal.org/resource-volan-dgw-spreadsheet).

[15] https://en.wikipedia.org/wiki/ISO_2848

Primel ⊡ Selected "Ell" Series Units				
Quantity	Quantitel Form and Abbrev	Colloquial and Abbrev	Derivation	SI and USC Equivalents
Length	**prime·biqua·lengthel** ⊡b↑lgℓ	**prime·ell·length** ⊡ℓ·lg	(resembles English ell measure)	1.1811 m 3.↊6$_z$=3.875$_d$ ft
Area	**prime·quadqua·areanel** ⊡q↑arℓ	**prime·ell·area** ⊡ℓ·ar	⊡ℓ·lg^2	1.39499721$_d$ m^2 15.015625$_d$ ft^2
Volume	**prime·hexqua·volumel** ⊡h↑vmℓ	**prime·ell·volume** ⊡ℓ·vm	⊡ℓ·lg^3	1.647631204731$_d$ m^3 58.185546875$_d$ ft^3
Mass	**prime·hexqua·massel** ⊡h↑msℓ	**prime·ell·mass** ⊡ℓ·ms	⊡ℓ·vm × ⊡dsℓ	1647.58507106$_d$ kg 3632.30331907$_d$ lb
Force Weight	**prime·hexqua·forcel** ⊡h↑fcℓ **prime·hexqua·weightel** ⊡h↑wtℓ	**prime·ell·force** ⊡ℓ·fc **prime·ell·weight** ⊡ℓ·wt	⊡ℓ·ms × ⊡accℓ	1645.88246204$_d$ kg$_f$ 16.1405932464$_d$ kN 3628.54970872$_d$ lb$_f$
Energy Work	**prime·octqua·energel** ⊡o↑ngℓ **prime·octqua·workel** ⊡o↑wkℓ	**prime·ell·energy** ⊡ℓ·ng **prime·ell·work** ⊡ℓ·wk	⊡ℓ·fc × ⊡ℓ·lg	19.063654683323$_d$ kJ
Pressure	**prime·biqua·pressure** ⊡b↑psℓ	**prime·ell·pressure** ⊡ℓ·ps	⊡ℓ·fc ÷ ⊡ℓ·ar	11.570340880008$_d$ kPa

used in the construction industry in Europe. (For instance, 1200$_d$ mm is the standard width for drywall panels in Europe, comparable to the 4 feet or 48$_d$ inches for that in the U.S.) From this length unit, we can derive a family of prime·ell based units (see table on page 13$_z$):

- Squaring the prime·ell·length yields the **prime·ell·area** (⊡ℓ·ar), the colloquial name for the prime·quadqua·areanel (⊡q↑arℓ = 10,000$_z$ ⊡arℓ).
- Cubing the prime·ell·length yields the **prime·ell·volume** (⊡ℓ·vm), the colloquial name for the prime·hexqua·volumel (⊡h↑vmℓ = 1,000,000$_z$ ⊡vmℓ).
- Filling the prime·ell·volume with water at one prime·densitel yields the **prime·ell·mass** (⊡ℓ·ms), the colloquial name for the prime·hexqua·massel (⊡h↑msℓ = 1,000,000$_z$ ⊡msℓ).
- Multiplying the prime·ell·mass by one prime·accelerel yields the **prime·ell·force** (⊡ℓ·fc), the colloquial name for the prime·hexqua·forcel (⊡h↑fcℓ = 1,000,000$_z$ ⊡fcℓ), or the **prime·ell·weight** (⊡ℓ·wt) the colloquial name for the prime·hexqua·weightel (⊡h↑wtℓ = 1,000,000$_z$ ⊡wtℓ).
- Applying a prime·ell·force over one prime·ell·length yields the **prime·ell·work** (⊡ℓ·wk), the colloquial name for the prime·octqua·workel (⊡o↑wkℓ = 100,000,000$_z$ ⊡wkℓ) or the **prime·ell·energy** (⊡ℓ·ng), the colloquial name for the prime·octqua·energel (⊡o↑ngℓ = 100,000,000$_z$ ⊡ngℓ).
- Dividing the prime·ell·force by the prime·ell·area yields the **prime·ell·pressure** (⊡ℓ·ps), the colloquial name for the prime·biqua·pressurel (⊡b↑psℓ = 100$_z$ ⊡psℓ).
- And so forth.

Primel ⊡ Selected "Foot" Series Units				
Quantity	Quantitel Form and Abbrev	Colloquial and Abbrev	Derivation	SI, USC, TGM Equivs
Length	**prime·trina·unqua·lengthel** ⊡t·u↑lgℓ= 30_z ⊡lgℓ	**prime·foot·length** ⊡ft·lg	(resembles customary foot and TGM Grafut)	Ɛ$.76_z$=11.625_d in 0.295275_d m ≈ Grafut
Area	**prime·ennea·biqua·areanel** ⊡e·b↑arℓ= 900_z ⊡arℓ	**prime·foot·area** ⊡ft·ar	⊡ft·lg^2	0.9384765625_d ft^2 8.7187325625_d dm^2 ≈ Surf
Volume	**prime·bitrina·triqua·volumel** ⊡bt·t↑vmℓ= $23{,}000_z$ ⊡vmℓ	**prime·foot·volume** ⊡ft·vm	⊡ft·lg^3	0.909149169921875_d ft^3 25.74423809682744_d L ≈ Volm
Mass	**prime·bitrina·triqua·massel** ⊡bt·t↑msℓ= $23{,}000_z$ ⊡msℓ	**prime·foot·mass** ⊡ft·ms	⊡ft·vm × ⊡dsℓ	25.7435167353_d kg 56.7547393605_d lb ≈ Maz
Force Weight	**prime·bitrina·triqua·forcel** ⊡bt·t↑fcℓ= $23{,}000_z$ ⊡fcℓ **prime·bitrina·triqua·weightel** ⊡bt·t↑wtℓ= $23{,}000_z$ ⊡wtℓ	**prime·foot·force** ⊡ft·fc **prime·foot·weight** ⊡ft·wt	⊡ft·ms × ⊡accℓ	25.7169134694_d kg$_f$ 252.196769474_d N 56.6960891987_d lb$_f$ ≈ Mag
Energy Work	**prime·hexennea·quadqua·energel** ⊡he·q↑ngℓ= $690{,}000_z$ ⊡ngℓ **prime·hexennea·quadqua·workel** ⊡he·q↑wkℓ= $690{,}000_z$ ⊡wkℓ	**prime·foot·energy** ⊡ft·ng **prime·foot·work** ⊡ft·wk	⊡ft·fc × ⊡ft·lg	74.4674011064_d J ≈ Werg
Pressure	**prime·trina·unqua·pressurel** ⊡t·u↑psℓ= 30_z ⊡psℓ	**prime·foot·pressure** ⊡ft·ps	⊡ft·fc ÷ ⊡ft·ar	2.892585220827_d kPa ≈ Prem

Accommodating TGM Units

Primel auxiliary units need not be limited to just pure powers of its quantitels. We can include SDN multiplier prefixes as well, and the results can be granted appropriate colloquial names as well. One particularly interesting example is the "foot" series. (See the table on page 14_z.)

The prime·trina·unqua·lengthel (⊡t·u↑lgℓ = 30_z ⊡lgℓ) approximates the TGM Grafut as well as the USC foot, and therefore gets the colloquial name **prime·foot·length** (⊡ft·lg).

- Squaring the prime·foot·length gives us the prime·ennea·biqua·areanel (⊡e·b↑arℓ = 900_z ⊡arℓ) or **prime·foot·area** (⊡ft·ar). This approximates the TGM Surf.

  or
  prime·foot·volume (⊡ft·vm). This approximates the TGM Volm.

- Filling the prime·foot·volume with water at 1 prime·densitel yields the prime·bitrina·triqua·massel (⊡bt·t↑msℓ = $23{,}000_z$ ⊡msℓ), or **prime·foot·mass** (⊡ft·ms). This approximates the TGM Maz.

- Applying one prime·accelerel to a prime·foot·mass yields the prime·bitrina·triqua·forcel ($23{,}000_z$ ⊡fcℓ), or **prime·foot·force** (⊡ft·fc). This approximates the TGM Mag.

- Applying one prime·foot·force over one prime·foot·length yields the prime·hexennea·quadqua·workel ($690{,}000_z$ ⊡wkℓ), or **prime·foot·work** (⊡ft·wk). This approximates the TGM Werg.

- Dividing the prime·foot·force by one prime·foot·area yields the prime·trina·unqua·pressurel (30_z ⊡psℓ), or **prime·foot·pressure** (⊡ft·ps). This approximates the TGM Prem.

This demonstrates the close family relationship between Primel and TGM. The only reason these correspondences are approximations and not exact, is that Pendlebury and I chose slightly different values for our accelerels.

Note that these colloquials hinge on the ordinary word "foot." As a matter of principle, I will not try to appropriate Pendlebury's unit names as colloquials for Primel analogs. Pendlebury's coinages, after all, are portmanteaus, some of which are rather awkward and oblique. Likewise, I will not appropriate any of SI's "honor names" as colloquials for any Primel units, even where there might be a close analog. Honor names, after all, are completely opaque.

English Binary Series

The resemblance of the prime·hand·volume to the USC quart is remarkably close (less than a perbiqua off). Scaling this up and down by binary powers yields equally close analogs for all the traditional old English and USC volume units, everything from a **prime·tun·volume** (⊡tn·vm) to a **prime·gallon·volume** (⊡gal·vm) to a **prime·tablespoon·volume** (⊡tbsp·vm). Dividing the latter by 3 even yields a **prime·teaspoon·volume** (⊡tsp·vm) (consisting of precisely 9 prime·morsel·volumes) that is equally close to its own analog. (See table on page 16_{z}.)

I wouldn't say these auxiliary units are "dozenal-metric," per se, but Americans still might find them handy as a form of *mesures usuelles*.[16] Plus, they're an excellent opportunity for students to learn their powers of 2 in dozenal. With two powers of 2 as factors, dozenal is relatively friendly toward binary divisions.

Note that I chose not to use the hypothetical prime·~~ounce~~·volume (⊡~~oz~~·vm) as the colloquial name for the analog of the fluid ounce. The problem with "ounce" is that it is an English derivative of Latin *uncia*. But this unit isn't a dozenth of anything in Primel. So I've substituted **prime·swig·volume** (⊡swg·vm) instead.

A similar consideration applies to the hypothetical colloquial prime·~~inch~~·length (⊡~~in~~·lg) for the prime·trina·lengthel (3 prime·lengthels). The English word "inch" is another derivative of Latin *uncia*. While it is true that this size is a dozenth of the prime·foot·length, nevertheless in Primel the latter is not the coherent unit; it is just another auxiliary unit. So I propose the colloquial **prime·thumb·length** (⊡θb·lg) for the former, on the grounds that several languages translate "inch" into whatever word they use for "thumb." (Cf. Latin *pollex*, Italian *pollice*, Spanish *pulgada*, Portuguese *polegada*, French *pouce*, Dutch *duim*, Swedish *tum*, Danish *tomme*, Norwegian *tommer*.) It turns out the **prime·thumb·volume** (⊡θb·vm) (a cubic prime·thumb·length or prime·bitrina·volumel) is identical to the prime·tablespoon·volume.

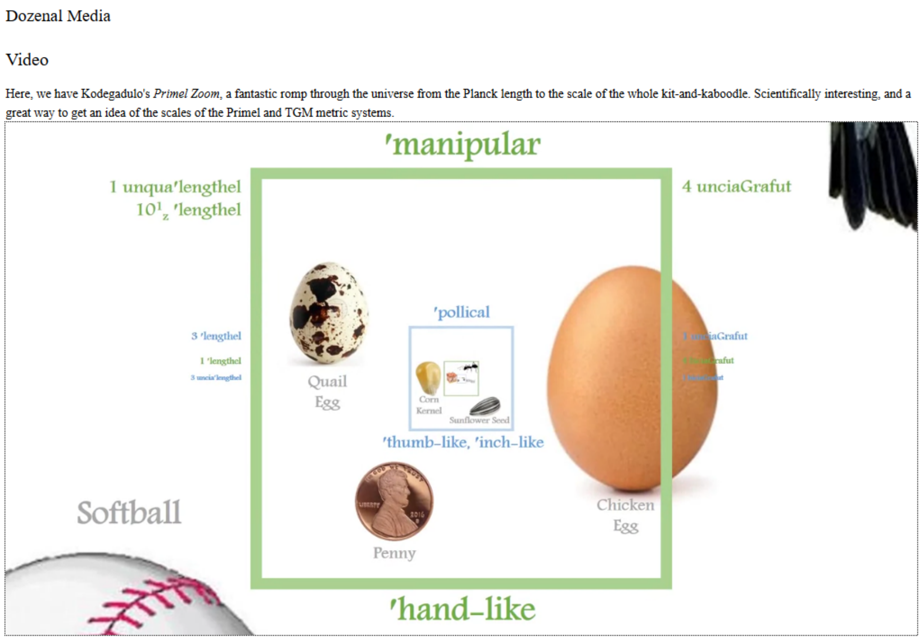
These volume units would all be associated with corresponding mass units, from **prime·teaspoon·mass** (⊡tsp·ms), **prime·tablespoon·mass** (⊡tbsp·ms), **prime·swig·mass** (⊡swg·ms), etc., to **prime·gallon·mass** (⊡gal·ms), ultimately to **prime·ton·mass** (⊡tn·ms) (approximating the USC ton and the metric tonne). The **prime·pint·volume** (⊡pt·vm) could be associated with a **prime·pound·mass** (⊡lb·ms). Likewise, these would be associated with corresponding weight (force) units, from **prime·teaspoon·weight** (⊡tsp·wt) to **prime·gallon·weight** (⊡gal·wt) to **prime·ton·weight** (⊡tn·wt), with **prime·pint·volume** and **prime·pound·mass** associated with a **prime·pound·weight** (⊡lb·wt).

Primel Zoom

I have celebrated the close family relationship between Primel and TGM in a Powerpoint presentation titled "Primel Zoom," which I first presented at the annual meeting of the Dozenal Society of America in Atlanta in 1200_{z} (2016_{d}). This presentation explores all levels of scale in dozenal terms, from the Planck length to

[16] https://en.wikipedia.org/wiki/Mesures_usuelles.

Primel ⊡ Analogs of English Binary Volume Series		
Quantitel Form and Abbrev	Colloquial and Abbrev	SI and USC Equivalents
prime·volumel ⊡vmℓ	**prime·morsel·volume** ⊡mo·vm	0.111949104136604_d tsp $0.5517883567798755787\overline{037}_d$ ml
prime·ennea·volumel ⊡e·vmℓ= 9_z ⊡vmℓ	**prime·teaspoon·volume** ⊡tsp·vm	1.00754193722944_d tsp $4.96609521101888020 8\overline{3}_d$ ml
prime·bitrina·volumel ⊡bt·vmℓ= 23_z ⊡vmℓ	**prime·tablespoon·volume** ⊡tbsp·vm **prime·thumb·volume** ⊡θb·vm	1.00754193722944_d tbsp 14.898285633056640625_d ml 14.898285633056640625_d ml 14.898285633056640625_d ml
prime·quadhexa·volumel ⊡qh·vmℓ= 46_z ⊡vmℓ	**prime·swig·volume** ⊡swg·vm (can't use ~~ounce·volume~~)	1.00754193722944_d fl oz 29.79657126611328125_d ml
prime·ennea·unqua·volumel ⊡e·u↑vmℓ= 90_z ⊡vmℓ	**prime·jack·volume** ⊡jck·vm (archaic word for a quarter cup)	2.01508387445887_d fl oz 59.5931425322265625_d ml
prime·unhexa·unqua·volumel ⊡uh·u↑vmℓ= 160_z ⊡vmℓ	**prime·gill·volume** ⊡gil·vm (archaic word for a half cup)	4.03016774891775_d fl oz 119.186285064453125_d ml
prime·trina·biqua·volumel ⊡t·b↑vmℓ= 300_z ⊡vmℓ	**prime·cup·volume** ⊡cu·vm	1.00754193722944_d cup 238.37257012890625_d ml
prime·hexa·biqua·volumel ⊡h·b↑vmℓ= 600_z ⊡vmℓ	**prime·pint·volume** ⊡pt·vm (related mass unit: **prime·pound·mass**)	1.00754193722944_d pt 476.7451402578125_d ml
prime·triqua·volumel ⊡t↑vmℓ= $1{,}000_z$ ⊡vmℓ	**prime·hand·volume** ⊡hd·vm	1.00754193722944_d qt 0.953490280515625_d L
prime·bina·triqua·volumel ⊡b·t↑vmℓ= $2{,}000_z$ ⊡vmℓ	**prime·pottle·volume** ⊡ptt·vm (archaic word for a half gallon)	0.50477096861472_d gal 1.90698056103125_d L
prime·quadra·triqua·volumel ⊡q·t↑vmℓ= $4{,}000_z$ ⊡vmℓ	**prime·gallon·volume** ⊡gal·vm	1.00754193722944_d gal 3.8139611220625_d L
prime·octa·triqua·volumel ⊡o·t↑vmℓ= $8{,}000_z$ ⊡vmℓ	**prime·peck·volume** ⊡pk·vm	2.01508387445888_d gal 7.627922244125_d L
prime·unquadra·triqua·volumel ⊡uq·t↑vmℓ= $14{,}000_z$ ⊡vmℓ	**prime·pail·volume** ⊡pl·vm	4.03016774891776_d gal 15.25584448825_d L
prime·biocta·triqua·volumel ⊡bo·t↑vmℓ= $28{,}000_z$ ⊡vmℓ	**prime·bushel·volume** ⊡bu·vm	8.06033549783552_d gal 30.5116889765_d L
prime·pentquadra·triqua·volumel ⊡pq·t↑vmℓ= $54{,}000_z$ ⊡vmℓ	**prime·strike·volume** ⊡stk·vm	16.120670995671_d gal 61.023377953_d L
prime·decocta·triqua·volumel ⊡do·t↑vmℓ= ↊8,000$_z$ ⊡vmℓ	**prime·barrel·volume** ⊡bbl·vm	32.2413419913421_d gal 122.046755906_d L
prime·unennquadra·triqua·volumel ⊡ueq·t↑vmℓ= $194{,}000_z$ ⊡vmℓ	**prime·seam·volume** ⊡sm·vm	64.4826839826842_d gal 244.093511812_d L
prime·trihexocta·triqua·volumel ⊡tho·t↑vmℓ= $368{,}000_z$ ⊡vmℓ	**prime·pipe·volume** ⊡pp·vm	128.965367965368_d gal 488.187023624_d L
prime·septunquadra·triqua·volumel ⊡suq·t↑vmℓ= $714{,}000_z$ ⊡vmℓ	**prime·tun·volume** ⊡tn·vm (related mass unit: **prime·ton·mass**)	257.930735930737_d gal 976.374047248_d L



A frame from the "Primel Zoom" video, about halfway through. The outermost green box represents a prime·unqua·lengthel (or prime·hand·length). The blue box within that represents an uncia·Grafut (or prime·thumb·length). The box within that represents a prime·lengthel (or prime·morsel·length). Barely discernible is a bicia·Grafut (or prime·dermal·length). The next step will expand the view to the Grafut (or prime·foot·length) level, and the step after that will expand it to the prime·biqua·lengthel (or prime·ell·length) level.

the span of the observable universe, interleaving dozenal powers of the Primel prime·lengthel with dozenal powers of the TGM Grafut. See page 17_z for an illustration.

Like a set of nested Russian dolls, each Primel-measured slide is followed by a TGM-measured slide that expands the view by 3; each TGM-measured slide is followed by a Primel-measured slide that expands the view by 4. Thus every 2 steps constitutes an expansion of the view by a dozenal order of magnitude. I take advantage of Powerpoint's "zoom" transition to give the sense of the view expanding with each step.

Along the way, I populate the view with representative objects that exist at each scale, from quarks and atoms, to everyday objects at the human scale, to galaxies and superclusters. Objects carry through from frame to frame, shrinking in the expanded view, as new objects surrounding them are revealed at the next level of scale.

DSA President Donald Goodman III (member 398_z) was kind enough to convert this presentation into a video, set it to music, and post it at on the DSA website.[17]

Reusing Unit Names

Quantitels can be reused across all metrologies, providing formal names for the respective coherent units of each metrology, but their sizes will tend to be very different from metrology to metrology, based on the choices made.Colloquial names can also be reused across many metrologies, but to a certain degree they are more "absolute" than quantitels. They intrinsically allude to particular levels of scale, so if one metrology borrows a colloquial name from another, the proviso is that the new version of the unit should be similar in size to the borrowed version. It need not be identical in size, but the closer of an analog it is, the better.

[17] https://dozenal.org/media-primel-zoom.webm

As an example, another DGW metrology I have experimented with is one I've dubbed "Tertiel" (brand prefix **tersh·**, brand mark ⚁), because it was the third idea that I had for a metrology.

Tertiel starts by selecting the pentcia·day as its **tersh·timel** (⚁tmℓ), but otherwise it proceeds with the exact same choices as Primel for the other "mundane realities." The tersh·timel is identical in size to the prime·unqua·timel, so colloquially the **tersh·twinkling·time** (⚁tw·tm) is identical to the prime·twinkling·time. It's just that Tertiel treats that period as its coherent timel, whereas Primel treats it as an auxiliary unit.

This leads to Tertiel's coherent **tersh·lengthel** (⚁lgℓ) being identical in size to Primel's prime·biqua·lengthel, so, colloquially, the **tersh·ell·length** (⚁ℓ·lg) is identical to the prime·ell·length, where "ell" refers absolutely to a size of $3Ɛ.6_z$ (46.5_d) USC inches, resembling the old English ell. In fact, the entire prime·ell series of derived units is exactly duplicated by corresponding derived tersh·ell series units. The only difference is that Tertiel treats all of those as its quantitels, whereas Primel treats them as dozenal scalings of its quantitels.

Primel units tend to be small; Tertiel units tend to be large. For instance, the **tersh·massel** (⚁msℓ) or **tersh·ell·mass** (⚁ℓ·ms), at over a ton and a half, is $1{,}000{,}000_z$ (a hexqua) times larger than the prime·massel. The **tersh·energel** (⚁ngℓ) or **tersh·ell·energy** (⚁ℓ·ng), at over 19_d kilojoules, is $100{,}000{,}000_z$ (an octqua) times larger than the prime·energel.

However, both metrologies can accept the "hand" unit series as useful auxiliaries that are more convenient in size. So for instance the **tersh·hand·mass** (⚁hd·ms) is identical to the prime·hand·mass, and both are a fair approximation of a kilogram. But Tertiel treats this as the **tersh·tricia·massel** (⚁t↓msℓ), 0.001_z of its huge massel; whereas Primel treats it as the prime·triqua·massel, 1000_z times its tiny massel.

My own personal preference is to build up from small units rather than build down from large units. Hence, I prefer Primel over Tertiel. It is a compelling analogy to take the gram and the prime·massel and scale both up by three orders of magnitude in their respective bases, to yield the kilogram and prime·triqua·massel, and have the results approximate each other so closely. However, if you prefer to start with large units and divide them down, you might find Tertiel an interesting alternative, reminiscent of the Meter-Tonne-Second system.[18]

Quantitels can even be used to talk about systems like SI and TGM. The DGW spreadsheet[19] includes SI as the **international** metrology with a globe emoji (🌐) as brand mark. It gives TGM the brand prefix **pendle** and brand mark ◒ (signifying Pendlebury's choice to cut the day in half). The international·timel (🌐tmℓ), international·lengthel (🌐lgℓ), and international·massel (🌐msℓ) would be the second, meter, and kilogram, respectively. The pendle·timel (◒tmℓ), pendle·lengthel (◒lgℓ), and pendle·massel (◒msℓ) would be the Tim, Grafut, and Maz, respectively.

When metrologies have unit name deficiencies, these can be alleviated with quantitels. For instance the international·velocitel (🌐vcℓ) can substitute for the "meter per second" (m/s). The international·accelerel (🌐accℓ) can substitute for the "meter per second squared" (m/s^2). The international·momentumel (🌐mmℓ) can substitute for the "kilogram·meter per second" (kg·m/s) or the "newton·second" (N·s). The international·actionel (🌐actℓ) can substitute for the "kilogram·meter squared per second" ($kg{\cdot}m^2/s$) or the "joule·second" (J·s).

TGM did a much better job than SI in coming up with coherent unit names for many quantity dimensions, albeit in Pendlebury's quirky and not-entirely-transparent style. Yet even he missed some quantities. For instance, TGM seems to lack an actionel. The closest we can get is MavGrafut (MvGf), but this is just a derived-unit formula multiplying the Mav (coherent unit of momentum) times the Grafut (coherent unit of

[18] https://en.wikipedia.org/wiki/Metre-tonne-second_system_of_units.
[19] https://dozenal.org/resource-volan-dgw-spreadsheet

length), and not really a unit name. But we can substitute the pendle·actionel (◒actℓ) as a more transparent name for this. We can only guess what Pendlebury might have come up with instead. "Actioz"?

Warming up to Temperature

The temperature scales in common use, Celsius and Fahrenheit, were derived by picking specific anchor temperatures, such as the freezing point and boiling point of water, and dividing the temperature difference by some "convenient" number to define a "degree" unit. But a DGW metrology derives its coherent unit of temperature, or **temperaturel** (abbreviated tpℓ), by first establishing a coherent relationship between heat and temperature. It takes an intrinsic thermodynamic property of water, its "specific heat capacity" — or as I prefer to term it, its "massic heatability"[1Ƨ] — and identifies that as a "mundane reality." Some candidate value for this property becomes a coherent unit, its **masselic·heatabilitel** (abbreviated msℓ\htbℓ),[1Ɛ] defined as one heatel per massel per temperaturel. The corresponding temperaturel is thus the temperature change you get when you apply one heatel (one energel in the form of heat) to one massel of water.

For most DGW metrologies, this turns out to be a very tiny temperature difference, because the massic heatability of water is relatively large. In general heat is a more "concentrated" form of energy than work. In Primel, the **prime·temperaturel** (⊡tpℓ) is equivalent to only about 19_d micro·kelvins. So to yield a more convenient temperature unit for everyday use, we need to scale this up with an SDN prefix. The **prime·quadqua·temperaturel** (abbreviated ⊡q↑tpℓ) turns out to be a fairly useful size.

In the Nineteenth Century/Dozen-First Biquennium, James Prescott Joule established the mechanical equivalence of work and heat. This means that one **prime·heatel** (⊡htℓ), the amount of energy in the form of heat needed to raise the temperature of one prime·massel of water by one prime·temperaturel, is equivalent to one **prime·workel** (⊡wkℓ), the amount of energy in the form of work needed to lift one prime·massel by one prime·heightel against one prime·accelerel of gravity. Likewise one **prime·quadqua·heatel** (⊡q↑htℓ) would raise one prime·massel of water by one prime·quadqua·temperaturel; this is equal to one prime·quadqua·workel, which would lift one prime·massel by one prime·quadqua·heightel.

Since the prime·quadqua·lengthel resembles an ancient Greek *stadion* unit, I've given it the colloquial name of **prime·stadial·length** (⊡ς·lg). Similarly, I've given the prime·quadqua·temperaturel the colloquial name **prime·stadial·temperature** (abbreviated ⊡ς·tp), or more concisely, **prime·stadegree** (⊡ς°).[20]

The massic heatability of water is another example of a "squishy" quantity, because it varies over a certain range depending on conditions of temperature and pressure; this gives us some wiggle room for selecting a quantitel. The strict average value over water's liquid range ($4190_d \frac{J}{kg \cdot K}$) yields a prime·stadegree very close to $\frac{5}{7}$ of a Fahrenheit degree. In fact, we can get a prime·stadegree *exactly* equal to $\frac{5}{7}$°F, by judiciously setting the **prime·masselic·heatabilitel** to a specific value (about $4198_d \frac{J}{kg \cdot K}$), that is well within the natural range for water in liquid state, only slightly above the average value, and slightly less than the standard dietary kilocalorie ($4200_d \frac{J}{kg \cdot K}$).

This choice has the effect of dividing the liquid range of water, from the freezing point to the boiling point, into exactly 190_z (252_d) prime·stadegrees. Compare this with the same range being covered by exactly 180_d Fahrenheit degrees, and of course exactly 100_d Celsius degrees. So even though the prime·stadegree is derived from an intrinsic property of water rather than from the difference between somewhat arbitrary

[1Ƨ] ISO 31-0 (see https://en.wikipedia.org/wiki/ISO_31) suggests *massic* as a substitute for "specific," with the meaning "a quantity divided by its associated mass." Similar *-ic* endings are used to derive *volumic* to indicate dividing by volume, *areic* for dividing by surface area, and *lineic* for dividing by length. Quantitels for such reciprocal quantities can be formed by appending **-elic**.

[1Ɛ] masselic = massel^{-1}. heatabilitel = heatel ÷ temperaturel.

[20] I know, I know. I made a big deal about eschewing portmanteaus earlier, and **prime·stadegree** is undeniably a portmanteau of "stadium" and "degree." All I can say is, nobody's perfect.☺ It seems like a catchy name to me, although others might disagree. If you prefer rigorous adherence to principle, then use **prime·stadial·temperature** as the colloquial.

Primel ⊡ Temperature Scales					
Description	Degrees Celsius	Prime Stadegrees Crystallic	Prime Stadegrees Familiar	Degrees Fahrenheit	Rankines Crystallic
°C = °F Equipoint	-40_{d}°C	$-84\frac{4}{5}{}_{z}$ ⊡ς°$_{c}$	$-44\frac{4}{5}{}_{z}$ ⊡ς°$_{f}$	-40_{d}°F	-72_{d} R_{c}
	$-38\frac{2}{21}{}_{d}$°C	-80_{z} ⊡ς°$_{c}$	-40_{z} ⊡ς°$_{f}$	$-36\frac{4}{7}{}_{d}$°F	$-68\frac{4}{7}{}_{d}$ R_{c}
$-\frac{1}{3}\Delta$Water	$-33\frac{1}{3}{}_{d}$°C	-70_{z} ⊡ς°$_{c}$	-30_{z} ⊡ς°$_{f}$	-28_{d}°F	-60_{d} R_{c}
	$-28\frac{4}{21}{}_{d}$°C	-60_{z} ⊡ς°$_{c}$	-20_{z} ⊡ς°$_{f}$	$-19\frac{3}{7}{}_{d}$°F	$-51\frac{3}{7}{}_{d}$ R_{c}
	$-23\frac{17}{21}{}_{d}$°C	-50_{z} ⊡ς°$_{c}$	-10_{z} ⊡ς°$_{f}$	$-10\frac{6}{7}{}_{d}$°F	$-42\frac{6}{7}{}_{d}$ R_{c}
Prime Familiar Zero	$-19\frac{1}{21}{}_{d}$°C	-40_{z} ⊡ς°$_{c}$	0_{z} ⊡ς°$_{f}$	$-2\frac{2}{7}{}_{d}$°F	$-34\frac{2}{7}{}_{d}$ R_{c}
Fahrenheit Zero	$-17\frac{7}{9}{}_{d}$°C	$-38\frac{4}{5}{}_{z}$ ⊡ς°$_{c}$	$3\frac{1}{5}{}_{z}$ ⊡ς°$_{f}$	0_{d}°F	-32_{d} R_{c}
	$-14\frac{2}{7}{}_{d}$°C	-30_{z} ⊡ς°$_{c}$	10_{z} ⊡ς°$_{f}$	$6\frac{2}{7}{}_{d}$°F	$-25\frac{5}{7}{}_{d}$ R_{c}
	$-9\frac{11}{21}{}_{d}$°C	-20_{z} ⊡ς°$_{c}$	20_{z} ⊡ς°$_{f}$	$14\frac{6}{7}{}_{d}$°F	$-17\frac{1}{7}{}_{d}$ R_{c}
	$-4\frac{16}{21}{}_{d}$°C	-10_{z} ⊡ς°$_{c}$	30_{z} ⊡ς°$_{f}$	$23\frac{3}{7}{}_{d}$°F	$-8\frac{4}{7}{}_{d}$ R_{c}
Freezing	0_{d}°C	0_{z} ⊡ς°$_{c}$	40_{z} ⊡ς°$_{f}$	32_{d}°F	0_{d} R_{c}
	$4\frac{16}{21}{}_{d}$°C	10_{z} ⊡ς°$_{c}$	50_{z} ⊡ς°$_{f}$	$40\frac{4}{7}{}_{d}$°F	$8\frac{4}{7}{}_{d}$ R_{c}
	$9\frac{11}{21}{}_{d}$°C	20_{z} ⊡ς°$_{c}$	60_{z} ⊡ς°$_{f}$	$49\frac{1}{7}{}_{d}$°F	$17\frac{1}{7}{}_{d}$ R_{c}
	$14\frac{2}{7}{}_{d}$°C	30_{z} ⊡ς°$_{c}$	70_{z} ⊡ς°$_{f}$	$57\frac{5}{7}{}_{d}$°F	$25\frac{5}{7}{}_{d}$ R_{c}
	$19\frac{1}{21}{}_{d}$°C	40_{z} ⊡ς°$_{c}$	80_{z} ⊡ς°$_{f}$	$66\frac{2}{7}{}_{d}$°F	$34\frac{2}{7}{}_{d}$ R_{c}
Room Temp	$21\frac{3}{7}{}_{d}$°C	46_{z} ⊡ς°$_{c}$	86_{z} ⊡ς°$_{f}$	$70\frac{4}{7}{}_{d}$°F	$38\frac{4}{7}{}_{d}$ R_{c}
	$23\frac{17}{21}{}_{d}$°C	50_{z} ⊡ς°$_{c}$	90_{z} ⊡ς°$_{f}$	$74\frac{6}{7}{}_{d}$°F	$42\frac{6}{7}{}_{d}$ R_{c}
	$28\frac{4}{7}{}_{d}$°C	60_{z} ⊡ς°$_{c}$	↊0_{z} ⊡ς°$_{f}$	$83\frac{3}{7}{}_{d}$°F	$51\frac{3}{7}{}_{d}$ R_{c}
$\frac{1}{3}\Delta$Water	$33\frac{1}{3}{}_{d}$°C	70_{z} ⊡ς°$_{c}$	↋0_{z} ⊡ς°$_{f}$	92_{d}°F	60_{d} R_{c}
Body Temp	37_{d}°C	$79\frac{6}{21}{}_{z}$ ⊡ς°$_{c}$	↋$9\frac{6}{21}{}_{z}$ ⊡ς°$_{f}$	98.6_{d}°F	66.6_{d} R_{c}
	$38\frac{2}{21}{}_{d}$°C	80_{z} ⊡ς°$_{c}$	100_{z} ⊡ς°$_{f}$	$100\frac{4}{7}{}_{d}$°F	$68\frac{4}{7}{}_{d}$ R_{c}
	$42\frac{6}{7}{}_{d}$°C	90_{z} ⊡ς°$_{c}$	110_{z} ⊡ς°$_{f}$	$109\frac{1}{7}{}_{d}$°F	$77\frac{1}{7}{}_{d}$ R_{c}
	$47\frac{13}{21}{}_{d}$°C	↊0_{z} ⊡ς°$_{c}$	120_{z} ⊡ς°$_{f}$	$117\frac{5}{7}{}_{d}$°F	$85\frac{5}{7}{}_{d}$ R_{c}
	$52\frac{8}{21}{}_{d}$°C	↋0_{z} ⊡ς°$_{c}$	130_{z} ⊡ς°$_{f}$	$126\frac{2}{7}{}_{d}$°F	$94\frac{2}{7}{}_{d}$ R_{c}
	$57\frac{1}{7}{}_{d}$°C	100_{z} ⊡ς°$_{c}$	140_{z} ⊡ς°$_{f}$	$134\frac{6}{7}{}_{d}$°F	$102\frac{6}{7}{}_{d}$ R_{c}
	$61\frac{19}{21}{}_{d}$°C	110_{z} ⊡ς°$_{c}$	150_{z} ⊡ς°$_{f}$	$143\frac{3}{7}{}_{d}$°F	$111\frac{3}{7}{}_{d}$ R_{c}
$\frac{2}{3}\Delta$Water	$66\frac{2}{3}{}_{d}$°C	120_{z} ⊡ς°$_{c}$	160_{z} ⊡ς°$_{f}$	152_{d}°F	120_{d} R_{c}
	$71\frac{3}{7}{}_{d}$°C	130_{z} ⊡ς°$_{c}$	170_{z} ⊡ς°$_{f}$	$160\frac{4}{7}{}_{d}$°F	$128\frac{4}{7}{}_{d}$ R_{c}
	$76\frac{4}{21}{}_{d}$°C	140_{z} ⊡ς°$_{c}$	180_{z} ⊡ς°$_{f}$	$169\frac{1}{7}{}_{d}$°F	$137\frac{1}{7}{}_{d}$ R_{c}
	$80\frac{20}{21}{}_{d}$°C	150_{z} ⊡ς°$_{c}$	190_{z} ⊡ς°$_{f}$	$177\frac{5}{7}{}_{d}$°F	$145\frac{5}{7}{}_{d}$ R_{c}
	$85\frac{5}{7}{}_{d}$°C	160_{z} ⊡ς°$_{c}$	1↊0_{z} ⊡ς°$_{f}$	$186\frac{2}{7}{}_{d}$°F	$154\frac{2}{7}{}_{d}$ R_{c}
	$90\frac{10}{21}{}_{d}$°C	170_{z} ⊡ς°$_{c}$	1↋0_{z} ⊡ς°$_{f}$	$194\frac{6}{7}{}_{d}$°F	$162\frac{6}{7}{}_{d}$ R_{c}
	$95\frac{5}{21}{}_{d}$°C	180_{z} ⊡ς°$_{c}$	200_{z} ⊡ς°$_{f}$	$203\frac{3}{7}{}_{d}$°F	$171\frac{3}{7}{}_{d}$ R_{c}
Boiling	100_{d}°C	190_{z} ⊡ς°$_{c}$	210_{z} ⊡ς°$_{f}$	212_{d}°F	180_{d} R_{c}

ΔWater = Boiling − Freezing = 100_{d} K = 180_{d} R = 190_{z} ⊡ς° = 1.9_{z} ⊡h↑tpℓ anchor temperatures, by sheer coincidence and some careful selection, we get a practical unit that exactly divides the liquid range of water into a fairly round number anyway. Best of both worlds, as it were.

Interestingly, a temperature difference of 100_z prime·stadegrees (or 1 prime·hexqua·temperaturel)[21] bears a strong resemblance to a temperature difference of 100_d Fahrenheit degrees (it is exactly $102\frac{6}{7}{}_d$°F difference). If we want to restrict ourselves to whole numbers, 103_z ⊡ς° = 105_d°F exactly.

Based on these observations, Primel offers three **prime·stadigrade** temperature scales[22] that all use the prime·stadegree, but that differ in their choice of zero point:

- The **prime·stadigrade·crystallic** scale (abbreviated ⊡ς°$_c$) places zero at the freezing point. In principle, it would be most reminiscent of Celsius, but in practice the numbers for various temperatures bear little resemblance to temperatures in Celsius. (See table on page 1↊$_z$ for a comparison.)[23] For comparison, I've included a "Rankines Crystallic" scale (R_c), which uses the same size degrees as the Fahrenheit or Rankine scales, but which places zero at freezing.

- The **prime·stadigrade·familiar** scale (abbreviated ⊡ς°$_f$) places zero at 40_z prime·stadegrees below freezing. Four dozen being a third of the way to a gross, this is reminiscent of Fahrenheit's choice to place the freezing point about a third of the way to a hundred. Consequently, many of the dozenal values along the prime·stadigrade·familiar scale, when interpreted as fractions of a gross, resemble decimal values on the Fahrenheit scale, when interpreted as fractions of a hundred. (See table on page 1↊$_z$ for a comparison.)

- The **prime·stadigrade·absolute** scale (abbreviated ⊡ς°$_a$) places zero at absolute zero, as do the kelvin (K) and rankine (R) scales. It turns out that the freezing point of water falls at 494.41_z ⊡ς°$_a$. This bears a greater resemblance to 491.67_d R than to 273.15_d K. Similarly, the boiling point of water falls at 664.41_z ⊡ς°$_a$, and this is more reminiscent of 671.67_d R than of 373.15_d K. Overall the prime·stadigrade·absolute scale most resembles the rankine scale, all due to the correspondence of the prime·hexqua·temperaturel to the hecto·rankine.

The Angle on Angles

Technically, units of plane angle are not part of Primel, nor by rights part of any particular DGW metrology. Rather, they are a common adjunct to all metrologies.

For the purposes of most physical sciences and mathematics, the **radian** is clearly the coherent unit of plane angle, and as such, should be used in conjunction with every scientific metrology.

For everyday usages, I also recognize a dozenal-metric set of angle units, based on dozenal divisions of the **turn** or **full angle** (τ radians or $360°_d$).[24] Of course, these divisions can be named by attaching appropriate SDN power prefixes onto the **turn**. (See table on page 20_z.)

The DSA founders also divided up the turn (or "cycle") in this way, but they used the same names for these angle units as they gave to their time units. The apparent motivation was to equate angular displacement of the sun across the sky with the duration it takes to do so. This seemed a bit off to me, because angles are not commensurate with times.

[21] Since the prime·hexqua·lengthel (⊡h↑lgℓ) gets the colloquial **prime·itineral·length** (⊡itn·lg), the prime·hexqua·temperaturel (⊡h↑tpℓ) could get the colloquial **prime·itineral·temperature** (⊡itn·tp) as part of the same colloquial family.

[22] Again, if you prefer strict adherence to principle, call these **prime·stadial·temperature** scales instead.

[23] The "Dozenal Popular Scale" from the Do-Metric System makes a better analog for Celsius than prime·stadigrade·crystallic. But of course that scale is not based on any coherent relationship between heat and temperature. It merely takes the same range between the same two anchor temperatures and divides it by a "convenient" gross instead of a "convenient" hundred.

[24] $\tau = 2\pi$.

Uncial Divisions of the Turn (⊙) and Associated Circumferal Units					
Formal Name and Abbrev	Colloquials and Abbrevs		Sexagesimal Equivs	Circumferal Unit and Abbrev	USC, SI Equivs
	Temporal	Geographic			
turn ⊙	**day·angle** dy∡	**global·angle** glb∡	$360°_\text{d}$	**circum·global·length** ⓒglb·lg	$24{,}883.2_\text{d}$ m 40045.6286208_d km
uncia·turn u↓⊙	**dwell·angle** dw∡	**continental·angle** cnt∡	$30°_\text{d}$	**circum·continental·length** ⓒcnt·lg	$2{,}073.6_\text{d}$ mi 3337.1357184_d km
bicia·turn b↓⊙	**breather·angle** br∡	**regional·angle** rgn∡	$2°30'_\text{d}$	**circum·regional·length** ⓒrgn·lg	172.8_d mi 278.0946432_d km
tricia·turn t↓⊙	**trice·angle** tr∡	**itineral·angle** itn∡	$12'30''_\text{d}$	**circum·itineral·length** ⓒitn·lg	14.4_d mi 23.1745536_d km
quadcia·turn q↓⊙	**lull·angle** lu∡	**dromal·angle** dr∡	$1'02.5''_\text{d}$	**circum·dromal·length** ⓒdr·lg	1.2_d mi 6336_d ft 1931.2128_d m
pentcia·turn p↓⊙	**twinkling·angle** tw∡	**stadial·angle** ς∡	$5.208\overline{3}''_\text{d}$	**circum·stadial·length** ⓒς·lg	0.1_d mi 528_d ft 160.9344_d m
hexcia·turn h↓⊙	**vibe·angle** vb∡	**habital·angle** hb∡	$0.43402\overline{7}''_\text{d}$	**circum·habital·length** ⓒhb·lg	44_d ft 13.4112_d m
septcia·turn s↓⊙		**ell·angle** ℓ∡	$36.1689\overline{814}_\text{d}$ milli·arc·sec	**circum·ell·length** ⓒℓ·lg	44_d in 1117.6_d mm
octcia·turn o↓⊙		**hand·angle** hd∡	3.01408179_d milli·arc·sec	**circum·hand·length** ⓒhd·lg	$3.\overline{6}_\text{d}$ in $93.1\overline{3}_\text{d}$ mm
enncia·turn e↓⊙		**morsel·angle** mo∡	0.25117348_d milli·arc·sec	**circum·morsel·length** ⓒmo·lg	$0.30\overline{5}_\text{d}$ in $7.76\overline{1}_\text{d}$ mm

I take a more nuanced approach: In my view colloquials for angular measures should generally end in the suffix ·**angle** (or any commensurate synonym, such as ·**latitude**, ·**longitude**, ·**azimuth**, ·**elevation**, ·**direction**, and so on). It's acceptable to reuse time unit colloquials as angle unit colloquials so long as they get one of these suffixes, indicating angles *associated with* times. (See the Temporal Colloquials column in the table on page 20_z.)

However, that is not the only correspondence suggestive of colloquial names for these angle units. We can give angles a "Geographic" interpretation by correlating fractions of a turn with fractions of Earth's circumference. In the process, we can also derive a set of **Circumferal** length units useful for navigation purposes. This is analogous to the correlation of minutes of arc to nautical miles, but I support this notion at all levels of scale, not just miles. (See relevant columns in the table on page 20_z.)

Circumferal units are not strictly part of Primel, but adjunct to it. They use brand prefix **circum**· (abbreviated as brand mark ⓒ), suggesting both that these lengths are derived from Earth's circumference and that they are "around" as large as the corresponding Primel analogs (though different). Other than the difference in branding, these units recapitulate all the same colloquial names as Primel's length units. This reuse of colloquial names is justified because the sizes are fairly close.

For convenience, I've elected to equate the **circum·stadial·length** (ⓒς·lg) to exactly a tenth of a statute mile, making each Circumferal unit exactly $\frac{74}{79}_\text{z}$ or $\frac{88}{93}_\text{d}$ of the corresponding Primel unit. This makes the **circum·hand·length** (ⓒhd·lg) exactly 3.8_z or $3.\overline{6}_\text{d}$ inches and identical to H. C. Churchman's "metron" from his Metronic system.[25] This also makes the **circum·dromal·length** (ⓒdr·lg) exactly 1.2_d statute miles, or one "naire" from Churchman's system. The **circum·global·length** (ⓒglb·lg) is exactly $24{,}883.2_\text{d}$ statute miles, a reasonable compromise between the meridional and equatorial circumference of the Earth. This is

[25] See *Duodecimal Bulletin*, Vol. 16_z, No. 1, WN 30_z, October 1176_z (1962_d), p. 17_z, http://dozenal.org/duodecimal-bulletin-030.

identical to Churchman's "dominaire" unit, though with a name that is a little less contrived and a little more transparent.

More to Come

This article by no means exhausts the subject of Primel and DGW systems. In future articles, I hope to cover some more advanced topics, including but not limited to:

- **Units for Angular Mechanics**: Although the radian is not metrology-specific, angular mechanics works with quantities that combine angles with mechanical units. My approach differs from SI's in that I treat plane angle as a distinct dimension rather than as a dimensionless quantity, with interesting results.

- **Units for Electromagnetism**: In order to make sense of all the quantities called out in Maxwell's Equations, and provide reasonable quantitels for them, I found it necessary to diverge even more radically from both SI and TGM, to the extent of overhauling the terminology used for electromagnetic phenomena, and even the interpretation of words such as "magnetism," "force field," and "flux." This is quite a large topic just by itself.

- **Units for Chemistry**: It took some finessing to provide quantitels for "amount of substance" and the various forms of solution concentrations in use in chemistry.

- **Units for Radiometry and Photometry**: There's a variety of quantities surrounding radiant energy and radiant power; and then a similar variety surrounding luminous energy and luminous power, with the luminous efficacy of the human eye as another "mundane reality" of human life.

- **Other DGWs**: Members of the DozensOnline forum have applied the techniques and tools I've outlined here to develop their own systems organized around other bases, including octal, hexadecimal, senary — even tetradecimal, and more! This meant generalizing from Systematic Dozenal Nomenclature to Systematic *Numeric* Nomenclature, to accommodate any base. The DGW Spreadsheet[26] has proven to be an indispensable tool for this, and deserves a thorough introduction of its own.

Primel Online

Most of the development of Primel occurred (and continues to occur) on the DozensOnline Forum, in the thread entitled "The Primel Metrology."[27] I've maintained the original post of that thread as an overall summary of the metrology, and try to keep it up to date with my latest ideas. In fact, that thread is part of an entire subforum dedicated to Primel now.[28] If you have questions or suggestions about Primel, DGW's, and so forth, by all means post them there.

I am also developing a Confluence wiki about Primel.[29] There is quite a bit of material there already, but it is still a work in progress, so it is by no means complete. Eventually, however, it will be the definitive resource.

In Conclusion

Thank you for taking a look at the Primel metrology. I hope this introduction to Primel *measures* has sparked some *measure* of interest in what life would be like using a coherent dozenal-metric system!

[26] https://dozenal.org/resource-volan-dgw-spreadsheet
[27] https://www.tapatalk.com/groups/dozensonline/the-primel-metrology-t666.html
[28] https://www.tapatalk.com/groups/dozensonline/the-primel-metrology-f32/
[29] https://primelmetrology.atlassian.net/wiki/spaces/PM/overview