Tables to show vertical correspondences of values in successive quantum elevations of the intuitive schema

In the terms of the hypothesis presented in *Intuitive Periodicity in Numerical & Temporal Sequence*, I have assumed that, regarding the process of the intuitive apprehension of numerical scales ascending from zero through the small integers, and proceeding to the largest generally conceivable integers (e.g., ‘one-trillion’), that there is a commitment to an intuitive schema, which is hypothesised as a feature of *universal* perception (it would be more accurate to refer to this in terms of Kant’s *transcendental apperception* – which term implies a set of pre-cognitive mental schemata which render perception possible – as the term ‘perception’ is easily confused with matters of *sense*-perception, and the schema I am suggesting must be available to the intuition prior to any involvement of the senses).

As described in the aforementioned link, the schema takes the form of *quantum helix* – that is, a series of successive elevations, each one mimicking the style of the elevation below it, to form a continuous scale which permits intuitive access to *graduated proportionality* between the lowest and the highest integers. The lowest elevation of this helix begins at 0 (or rather 0/1) and ends at 100 - in a position *theoretically above* zero, but, due to the selectivity of focus, as one is able to conceive of only a single elevation at any one time, technically 100 actually *replaces* zero.

Table A on p.2 shows the full range of values from ‘zero/one’ to ‘one-trillion’ in six elevations, i.e., from 10^0 to 10^{12} – each elevation representing an increase of factor 10^2. However, due to the limitations of space, it is necessary to compress the first exponential increase (represented by 0 to 10 on the lowest elevation) into a second table (in spite of the rather schematic arrangement of the values in tabular form, this difficulty exemplifies the role that the schema performs for the intuition in enabling such elasticity of proportion). Table B duplicates the first and second columns of Table A (columns 1&10 of Table B), but also shows the eight intervening columns corresponding to the low integers 2 to 9 of the initial elevation. Therefore, to read the values in their proper succession the sequence to follow is: Table B cols 1-9 >> Table A cols 2-10 >> Table B col. 1, and so on.

What the tables tend to obscure is the fact that the first exponential increase of 10^1 occurs over a much briefer span of the curve in spatial terms (from 0-10) than the second (from 10-100); that is to say that the values displayed in red are achieved more aggressively than those in black, by a ratio of 1:9 .

As each successive elevation of the helix mimics the pattern of its predecessor, it is assumed that the characteristics of the numerals according to their specific locations are also to an extent ‘inherited’ – this is what is implied in the term ‘vertical correspondences’.

The figures shown as *italics* (i.e., those ascending from the positions of 10, 20, and 30 in the initial elevation), are emphasised because they occupy positions where it was noted that the curve bends or veers significantly, that is, in its path back to the zero position.

Table A

10^{12}									
10^{10}	*10^{11}*	*$2(10^{11})$*	*$3(10^{11})$*	$4(10^{11})$	$5(10^{11})$	$6(10^{11})$	$7(10^{11})$	$8(10^{11})$	$9(10^{11})$
100,000,000	*1,000,000,000*	*2,000,000,000*	*3,000,000,000*	4,000,000,000	5,000,000,000	6,000,000,000	7,000,000,000	8,000,000,000	9,000,000,000
1,000,000	*10,000,000*	*20,000,000*	*30,000,000*	40,000,000	50,000,000	60,000,000	70,000,000	80,000,000	90,000,000
10,000	*100,000*	*200,000*	*300,000*	400,000	500,000	600,000	700,000	800,000	900,000
100	*1,000*	*2,000*	*3,000*	4,000	5,000	6,000	7,000	8,000	9,000
0/1	*10*	*20*	*30*	40	50	60	70	80	90

Table B

10^{12}									
10^{10}	$2(10^{10})$	$3(10^{10})$	$4(10^{10})$	$5(10^{10})$	$6(10^{10})$	$7(10^{10})$	$8(10^{10})$	$9(10^{10})$	*10^{11}*
100,000,000	200,000,000	300,000,000	400,000,000	500,000,000	600,000,000	700,000,000	800,000,000	900,000,000	*1,000,000,000*
1,000,000	2,000,000	3,000,000	4,000,000	5,000,000	6,000,000	7,000,000	8,000,000	9,000,000	*10,000,000*
10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000	*100,000*
100	200	300	400	500	600	700	800	900	*1,000*
0/1	2	3	4	5	6	7	8	9	*10*

However, I am not entirely happy with the registration of vertical correspondences in the tables shown above. It appears that the steady consistency of a double-zero (10^2) elevation at the same (100, or 0/1) position in each cycle does not adequately represent some of our patterns of numerical notation. For instance, the appearance of the figure 10,000 directly above 100 in the third elevation seems rather counter-intuitive, considering that when we express configurations of large numbers verbally we tend to break them up into manageable combinations of lower powers (it is more intuitive to speak 10,000 as 'ten thousand', rather than 'a hundred hundred'), and in representing the string of zeros in the higher exponentials we break up the string into groups of three zeros separated by commas. This not only makes a string of zeros easier to read, but also indicates how far we are elevated in the quantitative helix. If after reaching 900,000, we were forced to speak of a 'thousand thousand', we would lose some of the sense of a positional index, which is suggested in the concept 'one million'. Each subsequent progression of 10^3 requires an additional quantitative category ('billion', 'trillion', etc.).

As a faculty of the intuition, it is easier to accommodate the perception of a complete cycle when regarding the initial (0-100), and to a lesser extent the second (100-10,000) elevations; which means that in expressing larger exponentials we verbalise them as *factors* of these lower values. We tend towards a 'vernacular' description of any large value number in terms of the lowest preceding factor (ones, tens, or hundreds – no higher) in combination with its zero-string expressed in terms of its constituent 10^3 segments ('thousands', 'millions', 'billions', etc.). Additionally, in the vernacular it is usually preferable to say 'fifteen hundred' rather than 'one thousand five hundred', for example. It may be suggested that this is simply a consequence of the economic use of syllables, which I accept as being influential. However, I do not think this necessarily contradicts the observation of an organising tendency, with some flexibility, to express large numerical values verbally in terms of their lowest preceding factors, that is, in terms of their vertical correspondences to values on the initial elevation (0-100), and extending as far as 1000 (actually, 999) on the second.

This extension into the second elevation allows us to express larger exponentials – 900,000 for example – as 'nine hundred thousand', which corresponds vertically to 9 on the first elevation, and 900 on the second. In the distribution of values in Tables A&B above however, 10^6 ('one million') appears vertically above 100, suggesting that 900,000 should appear above 90. But successive quanta of 10^3 ('thousand', 'million', 'billion', etc.) should ideally be located in vertical registration in a position corresponding to 10 on the initial elevation, or 1000 on the second. Therefore, as we proceed in lateral progression beyond 1000: 2000, 3000, 4000, etc. (corresponding to 10, 20, 30, 40, etc.) we reach 9000, in vertical correspondence to 90 on the first elevation. At this point a certain leap is required in order to place 10,000 in its preferred vertical registration, not above 100, but instead above 10, complementing the 'ten' factor which precedes in 10,000.

This difficulty arises therefore after the first 10^3 quantum is reached, i.e., at 1000, on the second elevation. It is no longer comfortable to speak of 'ten hundred', or of 'twenty hundred', whereas it still remains so to say 'nine hundred' or 'nineteen hundred'. Values which are intermediate between whole ten-factors on this scale remain feasible; for instance 'twenty-five hundred' is feasible, while ‘thirty hundred’ is not. This suggests that the failure of complementarity (the need to say ‘*two* thousand’, rather than ‘twenty hundred’) is only a partial one on this level of elevation. The schema might not break down completely, and we can tolerate the difficulty; what is important is that a shift in the registration is permitted, allowing 9000 to be located directly above 90 on the first elevation, and 10,000 above 1000 on the second.

The effect of this is rather like the creation of a *weir* structure in the path of a river. As the re-tabulations of Tables A&B below on p.5 display, this effect is required only at the end of *alternate* elevations (those of the 2^{nd}, 4^{th}, and 6^{th} in our range of values). What this construction permits is the deferral of the second zero elevation which occurred at 100 in the first elevation, until the curve has reached the point above 10, rather than its ‘normal’ position above 0/1. For each value at this vertical position expressing a ‘ten’ factor in its configuration, there will be a $x10^1$ increase compared to the value below it, but a $x10^2$ factor is required to elevate these values to the next vertical position.

These shifts or adjustments therefore appear with certain regularity, and need not imply that the schema is inconsistent or ‘broken’. If we consider that the schema is a conceptual/intuitive tool, which does not depend on a conception of the series of elevations, or even of a complete single elevation, in its entirety. It is common enough, I find, to conceptualise a lateral progress along the first elevation (0-100) accessibly and with clarity. The problems identified along the second elevation, beginning at 1000, suggest that lateral progression from this point onwards becomes increasingly difficult, and the clarity of numerical positions on the first elevation is exchanged for an awareness of the positions of larger value numbers by *inference*. As we saw, there is a requirement of *linguistic complementarity* which enforces the registration of values in successive elevations according to their denomination as ‘thousands’, ‘millions’, ‘billions’, etc., or as interim 10x factors of the same, above 10 on the initial elevation, as well as the registration of numerals bearing a preceding double-zero above 100. It is the length of the zero-string which dominates in this registration, so that, while 2000 is expressed verbally with a preceding ‘two’, it retains a position above 20 in the initial elevation, rather than above 2.

Tables A2 & B2 on p.5 follow the same sequential ordering as the earlier tables, and are identical with respect to the first two elevations. The shifts, which first appear between the second and third elevations, are shown with greyed backgrounds, to include the values at both ends of the shift. In the first set of tables we found that 10^{12} (‘one trillion’) was reached after six complete elevations, whereas in the new tables the same value is not reached until seven cycles have completed, and an eighth elevation is extended as far as the 10 vertical correspondent. What is notable and perhaps significant is that the figures which are the sole occupants of the 3^{rd}, 5^{th}, and 7^{th} elevations in Table B2, at the end points of the three shifts, are the 4^{th}, 7^{th}, and 10^{th} powers of 10. In the first column of both tables the ascending vertical sequence of values above the 0/1 position is: 10^2, 10^5, 10^8, and 10^{11}, falling on alternate cycles.

Table A2

10^{11}	*10^{12}*								
	10^{10}	*$2(10^{10})$*	*$3(10^{10})$*	$4(10^{10})$	$5(10^{10})$	$6(10^{10})$	$7(10^{10})$	$8(10^{10})$	$9(10^{10})$
100,000,000	*10^{9}*	*$2(10^{9})$*	*$3(10^{9})$*	$4(10^{9})$	$5(10^{9})$	$6(10^{9})$	$7(10^{9})$	$8(10^{9})$	$9(10^{9})$
	10,000,000	*20,000,000*	*30,000,000*	40,000,000	50,000,000	60,000,000	70,000,000	80,000,000	90,000,000
100,000	*1,000,000*	*2,000,000*	*3,000,000*	4,000,000	5,000,000	6,000,000	7,000,000	8,000,000	9,000,000
	10,000	*20,000*	*30,000*	40,000	50,000	60,000	70,000	80,000	90,000
100	*1,000*	*2,000*	*3,000*	4,000	5,000	6,000	7,000	8,000	9,000
0/1	*10*	*20*	*30*	40	50	60	70	80	90

Table B2

10^{11}	$2(10^{11})$	$3(10^{11})$	$4(10^{11})$	$5(10^{11})$	$6(10^{11})$	$7(10^{11})$	$8(10^{11})$	$9(10^{11})$	*10^{12}*
									10^{10}
100,000,000	200,000,000	300,000,000	400,000,000	500,000,000	600,000,000	700,000,000	800,000,000	900,000,000	*10^{9}*
									10,000,000
100,000	200,000	300,000	400,000	500,000	600,000	700,000	800,000	900,000	*1,000,000*
									10,000
100	200	300	400	500	600	700	800	900	*1,000*
0/1	2	3	4	5	6	7	8	9	*10*