RARE MAPS FOR COLLECTORS

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Three previous articles in **Word Ways** [1,2,3] have discussed ways of mapping distinct integers onto letters so as to produce "perfect" or self-descriptive number-names. So far English, French, and Spanish have been examined. Glancing next at German, the same pencil and paper plus computer program approach already outlined in [1] can be used to find mappings such as:

A	B	C	D	E	F	G	H	I	L	N	O	R	S	T	U	V	W	Z
-25	16	3	-9	-10	-2	26	13	1	23	10	-20	21	0	17	-1	-8	14	-3

from which:

E+I+N+S	= -10+1+10+0	= 1	D+R+E+I+Z+E+H+N	= 13
Z+W+E+I	= -3+14-10+1	= 2	.	.
D+R+E+I	= -9+21-10+1	= 3	.	.
V+I+E+R	= -8+1-10+21	= 4	Z+W+A+N+Z+I+G	= 20
F+U+N+F	= -2-1+10-2	= 5	E+I+N+E+N+Z+W+A+N+Z+I+G	= 21
S+E+C+H+S	= 0-10+3+13+0	= 6	.	.
S+I+E+B+E+N	= 0+1-10+16-10+10	= 7	.	.
A+C+H+T	= -25+3+13+17	= 8	D+R+E+I+S+S+I+G	= 30
N+E+U+N	= 10-10-1+10	= 9	E+I+N+E+N+D+R+E+I+S+S+I+G	= 31
Z+E+H+N	= -3-10+13+10	= 10	.	.
E+L+F	= -10+23-2	= 11	.	.
Z+W+O+L+F	= -3+14-20+23-2	= 12	N+E+U+N+E+N+D+R+E+I+S+S+I+G	= 39

This unbroken run from 1 up to 39 puts German far in front of the three other languages, the best of which, French, reaches only 14. Note that from composites such as ZWEIENZWANZIG (22), E+N must equal zero. Thus from EINS (1) and EINENZWANZIG (21), S=0 and I=1. But from DREI (3) and DREISSIG (30), S+S+I+G = I+G = 27. Hence G=26. The above solution is among eleven alternative maps in which the largest absolute value to occur is 26. Suppose VIERZIG (40) were to be perfect also. Subtracting VIER (4) yields Z+I+G = 36. We know I+G = 27, so Z=9. But from ZEHN, Z+H = 10, so that H = 1 = I. Hence VIERZIG cannot be perfect unless H and I share the same value, contrary to stipulation.

Astrologology

Looking beyond cardinals, the same idea can be extended to other groups of words. Kickshaws for May 1991 included an example using **consecutive** integers applied to the names of the months so J+A+N+U+A+R+Y = 1, etc. Alternatively, astrology identifies each month with a sign of the Zodiac: January-Aquarius, February-Pisces, March-Aries, April-Taurus, May-Gemini, June-Cancer, July-Leo, August-Virgo, September-Libra, October-Scorpio, November-Sagittarius and December-Capricorn. Distinct integers can be assigned to the 17 letters of the Zodiac names as follows:

A	B	C	E	G	I	L	M	N	O	P	Q	R	S	T	U	V
-3	-8	7	-4	9	4	11	-2	-6	0	-7	-9	5	1	-5	3	-10

to yield:

A+Q+U+A+R+I+U+S	=	-3-9+3-3+5+4+3+1	=	1
P+I+S+C+E+S	=	-7+4+1+7-4+1	=	2
A+R+I+E+S	=	-3+5+4-4+1	=	3
T+A+U+R+U+S	=	-5-3+3+5+3+1	=	4
G+E+M+I+N+I	=	9-4-2+4-6+4	=	5
C+A+N+C+E+R	=	7-3-6+7-4+5	=	6
L+E+O	=	11-4+0	=	7
V+I+R+G+O	=	-10+4+5+9+0	=	8
L+I+B+R+A	=	11+4-8+5-3	=	9
S+C+O+R+P+I+O	=	1+7+0+5-7+4+0	=	10
S+A+G+I+T+T+A+R+I+U+S	=	1-3+9+4-5-5-3+5+4+3+1	=	11
C+A+P+R+I+C+O+R+N	=	7-3-7+5+4+7+0+5-6	=	12

The above assignments are the smallest set of integers to produce a solution. One using consecutive integers is impossible. On the other hand astrology also associates the signs of the Zodiac with heavenly bodies: sun, moon or planet in each case. However, nine planets plus one sun and one moon do not make twelve, so that a simple one-on-one relation cannot obtain. An alternative is to take the nine planets in order of their distance from the sun, a mapping that can be achieved with consecutive values:

-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8
J	H	M	L	C	N	V	T	U	R	I	S	E	Y	A	P	O

S+U+N	=	3+0-3	=	0
M+E+R+C+U+R+Y	=	-6+4+1-4+0+1+5	=	1
V+E+N+U+S	=	-2+4-3+0+3	=	2
E+A+R+T+H	=	4+6+1-1-7	=	3
M+A+R+S	=	-6+6+1+3	=	4
J+U+P+I+T+E+R	=	-8+0+7+2-1+4+1	=	5
S+A+T+U+R+N	=	3+6-1+0+1-3	=	6
U+R+A+N+U+S	=	0+1+6-3+0+3	=	7
N+E+P+T+U+N+E	=	-3+4+7-1+0-3+4	=	8
P+L+U+T+O	=	7-5+0-1+8	=	9

Chromatic Codes

Turning to a quite different area, the International Color Code is much used in the electronics industry for indicating component values, the ohmic value of resistors especially. The code assigns colors in spectral order to the ten decimal digits, 0-9, as follows: BLACK = 0, BROWN = 1, RED = 2, ORANGE = 3, YELLOW = 4, GREEN = 5, BLUE = 6, VIOLET = 7, GRAY = 8, WHITE = 9. Component values are represented by strings of colored dots or stripes which are then read from left to right, starting with the stripe printed nearest to one end of the component. Is it possible to map integers onto the 18 letters in the color words to produce self-descriptive codes? It is. Moreover, it can even be achieved using those self-same decimal digits only. The first assignment is American usage (GRAY), and the second, British (GREY):

-9	-8	-7	-6	-5	-4	-3	-2	-1	1	2	3	4	5	6	7	8	9
O	Y	C	D	H	B	N	K	E	G	T	V	U	I	A	L	W	R
C	T	D	G	N	L	O	H	U	K	R	W	B	Y	V	E	A	I

to produce:

B+L+A+C+K = -4+7+6-7-2 = 0
B+R+O+W+N = -4+9-9+8-3 = 1
R+E+D = 9-1-6 = 2
O+R+A+N+G+E = -9+9+6-3+1-1 = 3
Y+E+L+L+O+W = -8-1+7+7-9+8 = 4
G+R+E+E+N = 1+9-1-1-3 = 5
B+L+U+E = -4+7+4-1 = 6
V+I+O+L+E+T = 3+5-9+7-1+2 = 7
G+R+A+Y = 1+9+6-8 = 8
W+H+I+T+E = 8-5+5+2-1 = 9

Another way to present this is to prepare a strip as shown below, using felt pens to write the three symbols of each column in the color indicated above the strip. Afterwards get someone to choose a color on the strip. The name of the color can now be spelt out letter by letter, while the associated digits, positive when above, negative when below, are totalled. Their sum is, of course, that number printed in the color first selected.

bk	bn	rd	or	yl	gn	bu	vi	gy	wh
+	G	T	V	U	I	A	L	W	R
0	1	2	3	4	5	6	7	8	9
–	E	K	N	B	H	D	C	Y	O

Note that no letter is assigned to zero here. Alternative mappings using -8,-7,..,0,1,...,9 or -9,-8,...,0,1,...,8 can be found to produce American or British versions in both cases. Going one step further, since negative values cannot be represented in the International Color Code, I speculated whether an extra color could be brought in to use as a minus sign. Suppose pink in first position is to indicate that the value it precedes is negative. Thus pink multiplies by -1. Bringing in the new letter P and assigning all **ten** digits as follows:

-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	
P	O	K	C	W	V	E	G	U	D	B	Y	A	H	R	T	I	N	L	gray
T	K	N	U	D	W	L	G	V	R	A	C	Y	O	P	H	E	B	I	grey

yields the same sums as above, together with P+I+N+K = -1, as required. Surprisingly the same trick can be worked using silver (and adding S) or Magenta (and adding M) instead. The first pair of codes employ silver, and the second pair, magenta:

-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	
N	W	V	D	A	U	C	I	S	K	L	E	Y	G	O	R	B	T	H	gray
I	C	N	U	D	W	L	G	V	R	A	K	Y	O	S	H	E	B	T	grey
T	C	K	O	U	M	D	G	W	N	Y	E	R	L	B	A	V	H	I	gray
W	G	D	C	U	T	V	K	N	L	O	A	M	R	E	B	Y	I	H	grey

A Sematric Variant

One further map deserves a place in this collection. As detailed in [4], in **sematria** numbers are represented in a positional notation that uses letters as digits. The base used is 27, with A=1, B=2, etc., and an extra sign standing for 0, e.g. "@". Every letter string then corresponds to a unique integer. Thus, ABC = $Ax27^2 + Bx27^1 + Cx27^0$ = 1x729 + 2x27 + 3 = 786. Word-integers are called **wints.** This system can be exploited to produce perfect numbers of a quite novel kind. A clear distinction between lower case **variables** and upper case **digits** is then essential. Let:

e =	7052	=	IRE		r =	10779793	=	TGRBP
f =	-78366425	=	-ELLKNE		s =	-68017387	=	-DSZQHM
g =	2555594	=	DUVPQ		t =	5684	=	GTE
h =	1	=	A		u =	67714013	=	DSKFDK
i =	271396	=	MUGS		v =	78213235	=	ELDQJM
l =	9	=	I		w =	7331	=	JAN
n =	2029	=	BUD		x =	67760109	=	DSMOJR
o =	2237	=	CAW		z =	-10273178	=	SHYDB

z+e+r+o	=	515904	=	ZERO
o+n+e	=	11318	=	ONE
t+w+o	=	15216	=	TWO
t+h+r+e+e	=	10799546	=	THREE
f+o+u+r	=	129618	=	FOUR
f+i+v+e	=	125258	=	FIVE
s+i+x	=	14118	=	SIX
s+e+v+e+n	=	10211981	=	SEVEN
e+i+g+h+t	=	2839691	=	EIGHT
n+i+n+e	=	282506	=	NINE
t+e+n	=	14729	=	TEN
e+l+e+v+e+n	=	78236429	=	ELEVEN

The example explains itself better than any verbal description. Note that a few of the integers mapped onto e,f,.. are themselves wints. Could the same result be achieved using wints only? The above is the best solution known. Going beyond consecutive series, what letter values will maximize the perfect cardinals produced? That ELEVEN marks the limit here can be proved as follows. From the anagram, twelve+one : eleven+two, we see that t+w+e+l+v+e = e+l+e+v+e+n + t+w+o - (o+n+e). But although 12 = 11+2-1, TWELVE ≠ ELEVEN + TWO - ONE because 78236429 + 15216 - 11318 = 78240327 ELF@NX ≠ TWELVE = 299309045. A mathematical proof that relies on an **anagram**? Now these are deep waters, Jeeves!

REFERENCES

[1] L. Sallows, The New Merology, Word Ways, Feb 1990, pp 12-19
[2] L. Gordon and A.R. Eckler, Answering the Sallows Challenge, Word Ways, MAy 1990, pp 93-5
[3] L. Sallows, Spanagrams, Word Ways, Feb 1992, pp 59-60
[4] L. Sallows, Base 27: The Key To A New Gematria, Word Ways, May 1993, pp 67-77

THE LINGUISTICS WARS

Non-linguists attempting to understand this field are in the position of apartment-dwellers listening to a violent argument on the other side of the wall; one senses the acrimony but has only the foggiest notion of what the shouting is all about. Randy Allen Harris's new book, published for $30 by Oxford University Press in 1993, is a by-and-large successful attempt to make sense of the Chomskyian revolution in linguistics, including the counterrevolutions spawned by it. Though it is difficult for the non-linguist to keep the many strands of the story in perspective, Harris organizes it well, and writes in a breezy and engaging manner that makes it difficult to put the book down. Linguistics, a wannabe science, is hampered by the fact that language is a brain-based activity, subject to staggeringly-complex physical laws; it is easy to shoot down any theory of language with counterexamples (usually in the form of grammatical sentences which the proposed theory does not account for). Because nearly everyone fancies himself an expert (user) of language, critics of linguistic theories are easy to find. The towering influence and reputation of Chomsky has shaped the field, and his contentious nature seems to have established the terms of debate as well: a scandalous degree of incivility and invective that must be off-putting to scholars from neighboring disciplines such as philosophy and psychology who seek to apply linguistic insights to their problems. If you want to get a flavor of what modern linguistics is all about, read this book first - you can't appreciate the players and their varying prejudices without this scorecard!