FIBONACCI WORDS: "HOWL, SEX ORGY POET!"

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No, not a direct quote from Leonardo Fibonacci of Thirteenth Century Florence, just words based on translating his famous number sequence into letters, with A-Z = 1-26, 27-52, etc. There are two types of Fibonacci words, "natural" and "arbitrary".

"**Natural** Fibonacci words" are composed of the letters of adjacent numbers in Fibonacci's series. The first 84 numbers (0,1,1,2,3,5,8,13,21... to ~2.4 quadrillion) produced this string of 84 letters:

ZAABCEHMUHCKNYMLYKJUEZEEJOYNMANOCRUMHUCXAYZ
YYXWURMERWOLAMNAOPEUZUUPKALMYLKWHEMREWBYA.

But then it looped back on itself and repeated! Ad infinitum. And it threw up a very non-average group of letters. Despite being over three alphabets long, seven letters are absent (DFIQSTV) and all those present are in powers of two (2, 4 or 8). Furthermore, 43% of them are vowels (counting Y), as opposed to 23% in the alphabet. This should however make the string richer in words than a truly random string might be, which adds to its interest. But it is of most interest because of the sacred aura surrounding the notion of the sum total of all "*FIBONACCI WORDS*"! I done wanna bringya down, but it is rather disappointing, I'm afraid. There were only seven words of over two letters. A massive word list might reveal other words. (My list was limited to three dictionaries--Random House, Macquarie, and *The Cassel Dictionary of Slang*.)

ZEE JOY MAN CRUM RUM LAM HEM

The first two are contiguous, so perhaps a coinage: ZEEJOY is a delight in that brazen, rare letter. There were also five reversals (baa, hum, jeez, con, low) and a bunch of 2-letter words.

"**Arbitrary** Fibonacci words" are slightly more interesting. They are formed by taking each of the 676 bigrams in turn and adding the numerical value of the two letters to get a third then adding the last two letters of the three to get a fourth, then the last two of the four to get a fifth, and so on as in the Fibonacci formula. In fact, over half of the above string of letters came via this shortcut, since my calculator kicked out at #40 on just over a hundred million. The two methods agreed up to #39 (63,245,986). This more sweeping apoproach yielded a larger but still small list of words. I found only forty-five English common words, listed below, plus a few proper names, well known acronyms, foreign and obsolete words (*Ars*, *Dei*, DOS, *ein*, Eva, *hai*, Ira, IUD, *mer*, Poe, Suni, *wif, wurmer)*. *Wurmer* (worms, G.) was the only word of more than four letters except for the trick of counting long strings of z's as equivalent to zzz. Dubious coinages of five - seven letters occurred: POETY--like a poet, ZEEJOY and SEXCADE--a cavalcade of sex (a Mardi Gras parade?). Even four letter words were rare, most being mere trigrams. A, E, N, Q and X had none.

BEG	Jis, jis, JOY	SAT, SEX, SIB, SOH, SUN
CAD, CADE, COR, CRUM	KIT	TAU, TIC
DIM	LAM, LUG	UNI
FAG	MAN, MOB	VIE
GEL, GIP, GOV, GUB	ORGY, OTIC, OWL	WAX, WAXY, WEB
HEM, HOW, HOWL	POET	YON
I'VE	RIA, RUM	ZEE, ZOO, ZZZ(ZZZZZ...)

[crum = crumb, Gov & Gub = forms of address, Jis = Jeez!, jis = to ejaculate, uni = University, cade = hand reared (of abandoned animals) or a juniper, otic = of ears, ria = coastal indentation]

There were also thirty-one reversals, including six of four letters (five above + air, ash, Ave, bis, bomb, bug, cab, doo, dye, leg, mid, out, pig, sari, sen, sod, sux, toe, vim, wave, who/s, win, yet, yip/s).

Pattern

If any bigram is Fibonaccied indefinitely it will eventually loop back on itself as in the natural case. There's no overlapping or networking between loops as every bigram strictly dictates one of the 14 loops I found. Surprisingly, to a non-mathematician like myself, most of the loops had one of just two lengths. Six loops, including *all* the vowels and all but one of the 'words', each had exactly 84 letters (and bigrams), like--and including--the "natural" loop above. Another six, containing only consonants and no words, had 28 letters each. They were all even numbered letters whereas all six vowels are odd numbered (#1,5,9,15,21,25). The 84-letter sets had the same fine structure as the Fibonacci series itself, a strict alternation of one even and two odd numbers. This pattern balances out the purely even 28-sets, giving overall an equality of even and odd numbers, as predictable of course because the alphabet has an equal number of odd and even letters. So it has equal numbers of bigrams of even-even, odd-odd, even-odd and odd-even letters. The six 28-letter loops have the same number of letters as two 84s, so each combination (ee, oo, eo, oe) has 168 bigrams. 4x168= 672. But there are 676 possible bigrams, so what happened to the other four? The answer is that the remaining two loops involve Z. Z amounts to Zero when added to any letter--as noted in letter #1 above. And M is 1/2 of Z. Thus the last two loops are tiny, consisting of: MZM[MZMMZM..] containing three bigrams (MZ, ZM, MM) and no words, plus ZZ[ZZZZZ....] with one bigram and one word--or an indefinite number of 'words'.

Why did it all behave so neatly with the main loop sizes all 84 or 28? And given equal loops, why not 78 and 26, since 26 is the modulus? Why the power-of-two frequency coefficients in all of the loops? Why no sixes or singles (except for Z in the two mini-loops)? Can the editor or any other mathematical reader explain all this?

A Game

"Fibonacci words" is now a virtually closed set. To open things up I propose a word shuffle game. Make a bunch of sentences from this--*or any other*--'random' collection of words. It's the same as anagramming but with words rather than letters. (Nonce usages are probably needed.) As a game the object would be to use the whole list with no repeats. Either the first to finish wins, or the one who uses all the words in the fewest sentences. Plus collectively judge for best quality. My easily bettered results with all the above list and no repeats took eight 'paragraphs' with fifteen sentences (see Answers and Solutions at the back of this issue).