Collinear Words

Letting $A = 1$, $B = 2$, ..., $Z = 26$, each word can be converted into a sequence of numbers. For example, GYP becomes $(7,25,16)$. Likewise, HUM, KID and LEA become $(8,21,13)$, $(11,9,4)$ and $(12,5,1)$ respectively. Now these four words have a very interesting property — if we look at the numbers. Let me write them down in a column:

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>25</td>
<td>16</td>
<td>GYP</td>
</tr>
<tr>
<td>8</td>
<td>21</td>
<td>13</td>
<td>HUM</td>
</tr>
<tr>
<td>9</td>
<td>17</td>
<td>10</td>
<td>iqj</td>
</tr>
<tr>
<td>10</td>
<td>13</td>
<td>7</td>
<td>jmg</td>
</tr>
<tr>
<td>11</td>
<td>9</td>
<td>4</td>
<td>KID</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
<td>1</td>
<td>LEA</td>
</tr>
</tbody>
</table>

Note that the numbers in the first column increase by 1, the numbers in the second column decrease by 4 and the numbers in the third column decrease by 3. In order to get from GYP to LEA we have to interpose two invalid "words", IQJ and JMG, but they can be disregarded.

If we think of the three columns as representing the $x$, $y$ and $z$ coordinates of space, then each word becomes a point in space and we can talk about the geometry of words. The regular property exhibited above by the four words GYP, HUM, KID and LEA corresponds to the fact that their four points in space all lie on a straight line. Thus GYP, HUM, KID and LEA can be said to be "collinear words".

Another set of familiar collinear words is:

<p>| | | | |</p>
<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>15</td>
<td>23</td>
<td>COW</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
<td>22</td>
<td>dmv</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>21</td>
<td>eku</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
<td>20</td>
<td>FIT</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>19</td>
<td>ggs</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
<td>18</td>
<td>HER</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>17</td>
<td>icq</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>16</td>
<td>JAP</td>
</tr>
</tbody>
</table>

In this case the first column increases by 1, the second column...
decreases by 2 and the third column decreases by 1. Also, we have to ignore four invalid "words". The remaining words, COW, FIT, HER and JAP, are collinear. Their line, of course, is different from the one determined by GYP, HUM, KID and LEA.

Other sets of familiar collinear words are BUD, HIP, JET, LAX; CRY, GNU, LIP, MHO; FAD, NIL, TOR, UPS.

One of the great U.S. recreational puzzle solvers, Robert L. Ward, claims that there are 31 sets of four collinear 3-letter words. (His reference to obtain admissible 3-letter words is the 1959 unabridged Second Edition of Webster's New International Dictionary of the English Language.) He also claims that there are no sets of five collinear 3-letter words.

Home to let
I hate to admit it, but I once watched a Benny Hill program on TV. That particular show pictured a building with a sign near its door:

```
H O M E S
T O L E T
```

After some young ladies went inside, a workman expanded the sign to read:

```
H O M M E S
T O L E T
```

The young ladies came running out. What the hell, Benny Hill!

Designing An Experiment

It occurred to me the other day that some people communicate by using bumper stickers. The messages are short, but they brag about collegial affiliations, tell you how to vote, tout vacation spots, worry about your salvation and even share a good joke. As you drive the highways, bumper stickers reveal a bit about other motorists' personalities and make them seem less like automations. On a long trip, you might first laugh at a humorous phrase and later note that the same driver, with his same message, is traveling the same route as yourself. You noticed this because of his bumper sticker.

I can imagine that in election years there are more political messages than at other times. I suspect that college campuses shout with displayed pride in the alma mater. Does religious fervor abound on the Sunday-morning, go-to-church, automobile?

- Has anyone ever studied bumper stickers? Almost undoubtedly, but I have never seen such a study. The idea has interested me enough to make me want to design an experiment for collecting information. How does one go about it?

First there is the business of collecting and recording the messages themselves. It seems unlikely that questionnaires sent out to motorists would produce worthwhile results. Who would take the time to reply? And the postage would be expensive. One could send questioner stickers. Some good sets would be spotty at best; how could one ever catch the flitting flier?
1. Also, we word, COW, use, is difference.

2. P, JET, LAX;

3. Robert L.

4. the 1959 unal Dictionary are no sets

5. Hill program a sign near expanded the

6. Hill!

7. communicate but they brag about vacation a good joke.

8. a bit about like automatic phrase message, is this because

9. more political religious ferrible?

10. undoubtedly, interested me for collecting

11. the messages sent out would take. One could send questionnaires to the manufacturers and/or retailers of bumper stickers. If they replied at all, they might be able to give some good sales statistics, but again I think the results would be spotty and not revealing enough, and the survey would not catch the fleeting homemade sticker. The only solution seems to be to go out and observe the messages in their natural habitat. Yet even here there seems to be some options. Should I stand on the street corner and watch the messages zip by? Or should I visit selected parking lots on appropriate days? This latter idea provides more stability of observation and may even show some correlations between messages and daily or weekly routines. Take the Sears parking lot for example. Is it uptown or downtown? Does that make a difference? What about church denominations? Are the Baptists more evangelical than the Lutherans? What about the bowling alley crowd? Do they have different messages to communicate than the moviegoers?

There are other variables that might be observed in this study. Where is the bumper sticker - left, right or middle? Maybe the message isn’t even on the bumper, but the rear window instead (I have seen many college names there). Or perhaps it is affixed to the trunk. Does it make a difference?

More important questions pertain to whether or not bumper messages reveal subtle trends or subliminal influence. Are the stickers more apt to be precursors or followers of events?

What sample size is appropriate for such a monumental study? Is it sufficient to observe 100 cars per lot? Or should the number of observations be keyed to the number of messages rather than cars? Later on, of course, there will be a tendency to group messages into categories such as religious, political, comical, etc. One should pick a sample size which would allow statistical inferences to be reasonably valid for these smaller groupings.

Well, I think I know what I want to do, and I have an idea about how I am going to do it. If anyone wants to conduct their own survey, it’s OK with me. Let’s see who publishes first.

Suspended Sentences

John Cartan had an interesting and amusing story in the February 1983 issue of Reader’s Digest. For those of you who missed it, I present a Kickshaw’s Digest.

He worries about the computers that automatically hyphenate words at the ends of lines. How might they produce unwanted results if not programmed properly? Some examples:

<table>
<thead>
<tr>
<th>Sentence 1</th>
<th>Sentence 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Her mother was a rather formidable obstacle to his marriage.</td>
<td>She gave him a &quot;come hit-her&quot; look when he came home late.</td>
</tr>
<tr>
<td>Crowds watched the old father leaving the surf.</td>
<td>She dropped her brass-her approach and tried coyness.</td>
</tr>
</tbody>
</table>
A Celestial Shaggy Dog

When Frank Sam met Sam Frank at a cocktail party, he thought someone was playing a joke on him. After all, their names were flip-flop images. Perhaps it was that similarity, however, which foretold of the close friendship that was to develop. Frank Sam and Sam Frank hit it off well together and, before long, they were inseparable companions. Wherever Sam Frank went, so did Frank Sam, and vice-versa of course.

A year passed before Sam Frank took ill and suddenly died. Frank Sam was unconsolable. The shock left him stunned. Eventually his mental depression began to affect his physical health, and within three months Frank Sam passed on as well.

When Frank Sam entered the gates of Heaven, his first words were, "Where's my buddy. Sam Frank? Where is he?"

The recording angel looked through the book and replied, "I'm sorry. He's not here. He must be at the other place."

"Well," said Frank Sam, "let me out. I want to visit my good friend."

At this point St. Peter joined in the conversation and instructed the newcomer, "First you must get your equipment. Follow that path down to the quartermaster supply and pick up your white robe, your harp, your halo and your wings. After that come back to see me and I'll give you a pass to the other place."

Zip! Frank Sam was off like a rocket. In no time at all he was back properly accoutered and carrying his harp. "Where's my pass? I've got to see my buddy!"

"Here is your pass," said St. Peter. "But you must pay heed to this warning: at midnight the gates to Heaven close and anyone left outside must stay outside through all eternity. You must return before the gates close at midnight."

Again, zip. Frank Sam dashed off to the other place. When he found himself walking down Main Street, he was attracted to one joint that was really rocking. The sound was vibrant and screams of excitement were pouring out of the front doors. Inside, the music pulsed as wild dancers gyrated to colored lights reflecting from mirrored balls in the ceiling. The place was alive.

It took one second for the two friends to spot one another. Frank Sam ran for Sam Frank and they joyously pounded each other, remembering all the great times they had shared on Earth. For the rest of the evening, they chatted and laughed and chatted some more. Frank Sam learned that Sam Frank was the owner of the night club and was pleased that he had done so well. But the night passed quickly and before long Frank Sam jumped up in surprise asking "What time is it?"

Sam Frank, looking at his watch, said, "Five minutes to twelve."

Zip, zip. Frank Sam hurried out, reaching the Pearly Gates just as they barely managed to close. Frank Sam lay there, "Where's your pass?"

With every step he took, he looked behind him, "Where's my harp?"

Dictionary Rail

1. A 6-letter word, the letter which is said to be the letter who is 1 apart from the letter who is 3 apart from the letters in alphabetical order. The letter who is 1 apart from 12122 the letter who is 1 apart from the letter who is 2 apart from the word?

2. Each letter is said to be the letter who is 3 apart from the letter who is 2 apart from the letter who is 1 apart from the word?

3. The letters who are 1 apart, 2 apart, and 3 apart, and blue letters in the word? What six corners of the product of the weight of the word? Is it a v dependent on whether or not the letters are in the word?"

4. The weight of the product of the letters in the word? What six corners of the product of the weight of the word?"

Dear Abby

As I write this, I am every Sat. This elderly just cannot understand. Since my Sat. 16166167?

Dear Abby

As I write this, I am every Sat. This elderly just cannot understand. Since my Sat. 16166167?
just as they were beginning to close. With a burst of speed, he barely managed to dive inside. Panting and struggling for air, Frank Sam lay on the cloud completely winded.

"Where's your harp?" demanded St. Peter.

With every last ounce of breath Frank Sam sang out, "I left my harp in Sam Frank's disco."

Dictionary Rally Problems

1. A 6-letter word containing three occurrences of a particular letter is said to be reduced to a 3-letter sequence by removing the letter which occurs three times and rearranging the remaining letters in alphabetical order. For example, PUPPET by this procedure is reduced to ETU. What words can be reduced to ELU, GLP, IMO, OLN, ACO?

2. Each letter of a word can be replaced by a 1 or a 2 depending on whether it is in the first or second half of the alphabet, respectively. A word, then, would appear as a sequence of Is and 2s. For example, FAVORITE can be converted into the sequence 1122212 since the 1st, 2nd, 6th and last letters are in the first half of the alphabet and the remaining letters are in the second half. Further, each letter of a word can be replaced by a c or a v depending on whether it is a consonant or a vowel, respectively. For example, FAVORITE can be converted into cvcvccv since the letters in the odd positions are consonants and the letters in the even positions are vowels. Determine the word that can be converted into 21222112112 and cvcccvccvccv.

3. The letters of a certain 5-letter word containing no repeated letters were colored green, red, yellow, blue and orange in some order. In the normal English alphabet, the green and red letters are 1 apart, the red and yellow letters are 6 apart, the yellow and blue letters are 5 apart, the blue and orange letters are 6 apart, and the orange and green letters are 4 apart. What is the word?

4. The weight of a letter is the number corresponding to its position in the following 26-letter sequence: CFOQDKISNRLXAUZHTWEVGPMYJB. The weight of a word is the number corresponding to the product of the weights of its component letters. For example, the weight of a word is the number corresponding to the product of the weights of its component letters. For example, the weight of Q is 4 and the weight of SODA is 8x3x5x13 = 1560. What six common words have weight closest to but not exceeding 1616616?

Dear Abby

As I write to you from this nunnery, my problem comes to visit me every Saturday with his boring accounts of events in the City. This elderly gentleman is the soul of grace and kindness but he just cannot understand that I wish to be alone.

Since my lover was killed in the war, I have chosen to retreat from life. He was, oh, so handsome and gifted with words. He
fairly made me swoon with the poetry of his letters. His face and figure were so manly and commanding.

Yet he died, in valor. And now this ugly old friend of his comes to remind me of those delicious days when life was young and gay and carefree. Dear Abby, how can I tell this kind old man that his attentions are not so eagerly desired and that I wish to live only with my memories of dear Christian? R.

Dear R: Everybody is a bore to somebody - even you, no doubt. From where I sit, it looks as if you are lucky to have such an attentive and entertaining friend - and my advice to you is to cherish him. Obviously this man needs an audience. Why not offer to assist him in writing the story of his life? If, as you suggest, he has an eye for beauty and a nose for news, he may have the makings of a novel in him - or even a play. In any case, you may be instrumental in helping him to solve a crisis of identity.

Breaking the Code

I must lead a sheltered life. About two months ago I was browsing through the Washingtonian magazine in my local library. As I flipped the pages, I noticed a cluster of "ads" that used the abbreviation ISO. It took me five minutes of probing to realize that the title of the column was "In Search Of" and that ISO was its shortened form.

Part of what made ISO interesting was the fact that the "ads" used several other abbreviations as well. Here is a sample of some of the items appearing in the column:

**LOOKING FOR ONE WONDERFUL BLACK MAN** — I know statistics show that you don't answer ads, but I'm worth growing classics. I'm BBF, 32, attractive, witty, discerning and picturesque. ISO 35-50 with strong sense of self ISO 130-694 Washington, D.C.

**INTERESTING, VITAL, YOUNG 45 WWJF** — looking to share an equality satisfying relationship. Pretty, romantic, thoughtful, sincere, with a positive outlook on life. Essays theater, travel, sports, dodgeball, cooking and conversation. ISO an outgoing selective, mature professional M 1 1 5 1 , who has it all together P.O. Box 343, Bethesda, Md 20817

**ENCOURAGE ME** — Personal ads are new to me, but I'm anxious to meet SWM with complementary interests (talking, sharing thoughts, dining, sailing, amputating and qualities [sanctity, openness, security, warmth]). I'm attractive, slender, 33. ISO DF 109-684 Washington, D.C.

According to "The Gold Bug" by Edgar Allan Poe, I ought to take a frequency count of the abbreviations, since they are obviously some kind of code. Furthermore, it might be important to distinguish those abbreviations before and after ISO. A quick tally reveals:

Before ISO: BBF-1, BBM-1, MBF-1, BBM-1, MBF-1, WM-1, WW-2, SWF-1, WM-1, WW-2, WWJF-1, WWJM-1, WWM-2


Can you fill in the blanks of the following:

How Fashions of the 1930s will be:

James Laver will be:

<table>
<thead>
<tr>
<th>Indecent</th>
<th>Shameless</th>
<th>Daring</th>
<th>Smart</th>
<th>Dowdy</th>
<th>Hideous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfeminine</td>
<td>Unfeminine</td>
<td>Unfeminine</td>
<td>Unfeminine</td>
<td>Unfeminine</td>
<td>Unfeminine</td>
</tr>
</tbody>
</table>

A Little Clue

An English puzzle, as is, to the CIA and expect.

An Almost Clue

SWJM-1, SWM-1
His face and of his comes young and old man, that I wish, no doubt.

I have such an to you is to you suggest, may have the case, you identity.

I was browsed library. As that used the to realize ISO was at the "ads" a sample of

<table>
<thead>
<tr>
<th>AAN</th>
<th>L</th>
<th>S</th>
<th>but I'm weak, th strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>- looking.</td>
<td>Pretty, shock on, drudge, effective, her PO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- me, but mentally saluting, sensitive, WW ISO an.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I ought to, since they in any distinguish these:

| WM-22, GBF-2, SBF-2, SJF-2, WM-2, WW-2, WM-2, DJM-2, M-1, SBM-2, I-1, SWF-29, |

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SWJM-1, SWM-1S, WF-7, WJM-1, WSF-1, WWDJM-1, WWM-2

Comparing the two lists, we see that similar abbreviations appear on both sides of ISO but the match is not exact. For example, there is no DOF before ISO nor any DJF after ISO. We have two pentagraphs after an ISO but none before. With respect to frequencies, SWM (35) is the highest before ISO and SWF (29) is the highest after ISO. Another interesting fact that I noticed is that the two GWMs before the ISO appeared in the same ad with the 2 GWMs after the ISO.

My guess is that we are working with a multilength, two-part commercial code. Because most ads have postal addresses or a six-digit numerical code attached to them, I believe we are dealing either with Russian agents who are announcing their letter drops or with the Mafia who are involved with the numbers racket, all unbeknownst to the editor of the magazine. I have notified the CIA and expect both plots to be exposed in the press very soon.

An Almost Clueless Crossword

An English friend of mine gave me the following crossword puzzle, as is, to solve:

Can you fill in the cells?

How Fashions Change

James Laver, in Taste and Fashion, says that the same costume will be:

| indecent 10 years before its time |
| shameless 5 years before its time |
| daring 1 year before its time |
| smart |
| dowdy 1 year after its time |
| hideous 10 years after its time |
| ridiculous 20 years after its time |
| amusing 30 years after its time |
| quaint 50 years after its time |
| charming 70 years after its time |
| romantic 100 years after its time |
| beautiful 150 years after its time. |
Howard County, Maryland

You may never have heard of Howard County. It has no large cities. Rather it has farms and neat villages that perch on hills or nestle in valleys between the great metropolises of Baltimore and Washington D.C. It is rural and suburban; and it delights the traveler with beautiful scenery.

I drive to work through a small part of Howard County. As I cross the Patuxent River, I begin my journey on Brown Bridge Road. Then half way up the hill I turn right onto Lime Kiln Road, and that takes me to Whiskey Bottom Road. The names of the roads, ways, streets, and courts beckon the explorer and welcome the poet. Let me share with you some of the charm, some of the captivating Howard County byways.

If you like wildlife, there are Browsing Deer, Chatterbird Place, Cross Fox Lane, Darting Bird Lane, Humble Bee Road, Marsh Hawk Way, Mink Hollow Road, Oven Bird Green, Spotted Horse Lane, and Wild Turkey Lane.

Nature of a different sort finds expression in April Day Garth, Berrypick Way, Cloud Burst Hill, Flight Feather, Kind Rain, Lighting View Road, New Leaf Court, Rainbow Span, Rising Moon, Rock Sparkle Row, Shadowshape Place, Sweetwind Place, Tawney Bloom, Tinted Hill, and Tufted Moss.

And there is whimsy: Catfeet Court, Fable Row, Folly Quarter Road, Greekboy Place, Hobson’s Choice Lane, Jacob’s Ladder, Kit Kat Road, Lover Not Place, Old Rover Road, Paul Revere Ride, The Mending Wall, and Wishing Bridle.

Visit Howard County. It’s a nice place to be.

More Street Talk

Logologists have paid far too little attention to street names. This past summer, Louis Phillips sent the editor of Word Ways his favorite street names from a 1908 book, The Street Directory of Principal Cities of the United States:

- AMPERSAND AVENUE, Saranac Lake NY
- ZIGZAG STREET, Columbia SC
- MYSTERY STREET, New Orleans LA
- HOW STREET, Haverhill MA
- PLATO ALLEY, Pittsburgh PA
- JUST RIGHT PLACE, Scranton PA
- OH STREET, Greenville PA
- WORD STREET, Dallas TX
- SIDE STREET, Boston MA
- PANHANDLE STREET, Chicago IL

I wonder how many of these still exist.

The editor also sent along a newspaper clipping from the March 29, 1984 Morristown Daily Record:

DOVER—If you think a street should be phooey after one resident requests its name be changed, this is probably the brunt that the Hooey Street residents live on. The Hooey residents made fun of their street name.

On April 21, 1984, two dozen residents of Hooey Street made fun of that street name.

... the hooey street, so the residents requested the name be changed to something else. The editor also sent along a newspaper clipping from the March 29, 1984 Morristown Daily Record:

Two Bilingual Signs

Once upon a time, two bilingual signs were erected in the backyards of the Hooey Street residents. They wished to mark the boundaries of the property. But the signs were written in Spanish and English, and the directions were confusing.

A Spaniard came to visit and could not understand the signs. He asked the residents what they meant and they did not understand his language either. So the Spaniard led a sock over his hand to indicate silence.

I wonder how many of these still exist.

The editor also sent along a newspaper clipping from the March 29, 1984 Morristown Daily Record:
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DOVER—If the residents of Hooey Street have their way, it'll be phooey on Hooey! They want to change the name of their street, so they've presented the board of aldermen with a petition requesting the street be renamed Rutan Drive ... the 18 residents claim they "have been subject to ridicule and been the brunt of many jokes because of the name of the street we live on." But Dale Hooey of Ledgewood ... says he's proud of the Hooey name. He doesn't know whether the street was named after one of his ancestors, but said he wouldn't want the name of the street changed if it were ...

On April 21, two descendants of the original Hooey wrote:

... the heirs of Samuel Hooey believe the name Hooey Street should remain, as it was named in honor of our great-great-grandfather 72 years ago, a farmer for 50 years on Salem Street in Dover, and an upstanding member of the community; no one made fun of his name then ... How long have the present residents lived on Hooey Street? Who chose the name Rutan Drive? Exactly what type of ridicule are the residents suffering? Do the residents not receive their mail and oil deliveries on time? Granted, most of us have been the brunt of ridicule in our lifetimes, and as adults we overcome such situations. However, residents of Hooey Street who signed a petition are letting other peoples' ridicule victimize them into being ashamed of the name of the street on which they live, instead of taking pride in its name. The heirs of Samuel Hooey (eight of us remain) feel once an honor is given it should not be taken away, and we are highly insulted to think the residents of Hooey Street who signed the petition would do such a thing.

Two Bilingual Jokes

Once upon a time there was a very beautiful French madamoiselle who had three kittens. Being of a logical and ordered mind, she named these kittens Un, Deux, and Trois. It happened to be winter and the ground outside was covered with snow. It was cold and the backyard pond had frozen to a sheet of ice. But, undaunted, the three little kittens romped in the snow and ventured onto the pond. At the edge, of course, the ice was relatively thick, but as the kittens approached the middle of the pond, the ice grew thinner and eventually broke. And Un, Deux, Trois quatre cinq!

A Spaniard, newly arrived in this country, entered a Sears store to purchase some socks. Unable to speak English, he asked for the socks in Spanish. As it turned out, the Sears salesman could not speak Spanish, so he was unaware of what the Spaniard wanted. Once again the Spaniard asked for socks in Spanish, perhaps a little louder, realizing that the Sears clerk could not speak his language. And again the salesman could not understand. The half conversations went on for some time with both parties losing patience. Finally the Spaniard noticed a counter display of socks. He grabbed the salesman by the arm, led him to the counter, dangled a sock in front of his eyes and said, "Eso, si? Qué es?" Where-
upon the Sears clerk responded, "If you knew how to spell it, why didn't you do so right at the beginning?"

IN QUEST OF ANAGRAMS AND PANGRAMS

The "Computer Recreations" column of the October 1984 Scientific American magazine should be of considerable interest to Word Ways readers and other logologists. In it, A.K. Dewdney first describes two multiple-word anagram generators (by Jon Bentley of AT&T Bell Labs and James A. Woods of NASA Ames Research Center) much like the one used by Mike Morton to generate Reaganagrams in the May Word Ways issue. All generators operate on an initially-specified collection of letters by starting with a word which uses a subset of these letters and then looking for all possible words which can be formed out of the remainder (if any). This tedious task is much shortened if one always starts with a word containing the rarest letter in the set.

A pangram is sometimes defined as a sentence containing all letters of the alphabet with repetitions allowed. Lee Sallows of Nijmegen, the Netherlands programmed a digital computer to search by brute force for 26 number-words which would make the following sentence self-descriptive: "This pangram contains [number-word] As, [number-word] Bs, ..., and [number-word] Zs." Since there are 16 different letters used in number-words from one through ninety-nine, he found himself examining 10^10 different possible solutions -- a task which would have taken the computer 31.7 million years! Nothing daunted, he constructed a special-purpose analogue computer which eventually reduced the time to only 105 minutes. Alas, there was no solution to the sentence given above, but by varying the initial verb to "lists" he achieved success:

This pangram lists four As, one B, one C, two Ds, twenty-nine Es, eight Fs, three Gs, eleven Hs, one I, one K, three Ls, two Ms, twenty-two Ns, fifteen Os, two Ps, one Q, seven Rs, twenty-six Ss, nineteen Ts, four Us, five Vs, nine Ws, two Xs, four Ys and one Z.

Empirically, Sallows discovered that about one verb in eight works, and one verb in sixty-four leads to two different solutions. It remains to be seen how few different letters can be used in a self-descriptive sentence; Sallows has discovered one with only 20 (omitting B, J, K, M, P, Q).

In the November 1971 Word Ways, Howard Bergerson exhibited a self-descriptive sentence that inventoried its words instead of its letters: "In this sentence, the word and occurs twice, the word eight occurs twice, the word four occurs twice, ..., and the word word occurs fourteen times."