So far-reaching is the power of words that it is even able to effect major changes in that rival domain, the world of numbers. We shall illustrate our thesis by considering the word square, a language form long regarded as Word's answer to Number's magic square.

Briefly, a word square is a set of words such that when arranged one beneath another in the form of a square they read alike horizontally and vertically. Examples of word squares, ranging in size from 4 x 4 to 8 x 8, follow:

<table>
<thead>
<tr>
<th>K I N G</th>
<th>Z E B R A</th>
<th>B A S S E T</th>
</tr>
</thead>
<tbody>
<tr>
<td>I D O L</td>
<td>E R R O R</td>
<td>A F L A M E</td>
</tr>
<tr>
<td>N O S E</td>
<td>B R I B E</td>
<td>S L O V E N</td>
</tr>
<tr>
<td>G L E N</td>
<td>R O B I N</td>
<td>S A V E R S</td>
</tr>
<tr>
<td></td>
<td>A R E N A</td>
<td>E M E R G E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T E N S E D</td>
</tr>
</tbody>
</table>

Larger word squares—9 x 9 and even 10 x 10—have been constructed, but their creation is extremely difficult and usually requires the use of mostly dialectal and obsolete words and names, so that they are not objects of beauty.

While there is a superficial resemblance between word squares and numerical magic squares, the relative dispositions of letters and numbers within the limits of the squares is entirely different. In an ordinary word square, the horizontal lines are identical with the corresponding ones in the corresponding lines in the numerical square. Instead, the numbers are interchanged with the letters, so that no two numbers are the same.

Words have not been completely challenged. Instead, there is a vast domain of transformations that correspond to the following examples of the numerical analogue:

```
3 2 1 6
2 0 4 7
+ 1 4 9 5
```
```
6 7 5 8
```

Each number square has two sets of numbers which are the same, and no two numbers are the same in both sets. There is also a clear correspondence between the letters in the word square and the numbers. The following is a word square of 4 x 4 size: a word square immediately arise:

1. How many 4 x 4 squares can be filled in a word square from all the rest?
2. Is there a mathematical answer?
3. Is there any mechanical answer?
4. Are there special letters that are guaranteed to be in the word square?
5. Many special features of the word square be incorporated?
6. Presumably, large number squares are guaranteed to have answers to the same conditions?
7. Is there a theoretical answer to the same conditions?
8. There is definitely that the numerical answer to the same limit, and how is it satisfied?
9. If we eliminate the word square, what is the remaining question?
A Numerical Analogue to the Word Square

A word square is a square array of words and the numbers representing those words. The numbers are identical with the corresponding vertical columns; in an ordinary magic square, no two numbers are the same.

Words have not been content to let the matter of this difference go unchallenged. Instead, they have compelled numbers to redeploy themselves into formations that correspond exactly to those typified by the word square. The following examples of the new number squares that toe the line have been supplied by Mr. Howard W. Bergerson of Sweet Home, Oregon:

<table>
<thead>
<tr>
<th>3216</th>
<th>2169</th>
<th>2318</th>
<th>5139</th>
</tr>
</thead>
<tbody>
<tr>
<td>2047</td>
<td>1305</td>
<td>3790</td>
<td>1046</td>
</tr>
<tr>
<td>+1495</td>
<td>+6074</td>
<td>+1956</td>
<td>+5487</td>
</tr>
<tr>
<td>6758</td>
<td>9548</td>
<td>8064</td>
<td>9672</td>
</tr>
</tbody>
</table>

Each number square has been devised as a problem in addition, with the summands or addends on the first three lines adding up to the total or sum on the fourth line. Each of these addition problems employs each of the ten numerals at least once. Each of the four horizontal numeral sequences in each problem is duplicated by the corresponding vertical numeral sequence.

If we demand that number squares of this type employ all of the ten numerals—as we should, so that numbers have the opportunity to demonstrate their wholehearted compliance with the new order—then the smallest square technically possible is 4 x 4 in size: a 3 x 3 square would use only 9 digits. Many questions immediately arise:

1. How many 4 x 4 squares is it technically possible to devise, each one different from all the rest?
2. Is there a mathematical formula for computing this number?
3. Is there any mechanical means of constructing all of them?
4. Are there special methods, analogous to those found for magic squares, that are guaranteed to produce the new number squares?
5. Many special features have been built into magic squares. Can comparable features be incorporated into these number squares?
6. Presumably, larger number squares can also be constructed. What are the answers to the same questions regarding 5 x 5, 6 x 6, 7 x 7, and still larger number squares?
7. Is there a theoretical limit to the size of a number square that satisfies our conditions?
8. There is definitely a limit to the size of possible number squares if we insist that the numeral 0 may not appear in the first vertical column. What is that limit, and how is it determined?
9. If we eliminate the requirement that all 10 numerals appear in a number square, what is the effect on the various matters touched on in previous questions?

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(10) If that requirement is eliminated, is it possible to construct any sort of numerical array that is both a number square of our kind and a conventional magic square?

(11) If we choose to regard the numerals in a number square as codes representing alphabetic letters, can we find a way of decoding each number square so that it converts into a regular word square?

The questions just listed occur to anyone giving the number squares some thought. In the course of striving to answer these questions, many others are bound to come up. It is to be expected, therefore, that research into number squares will gradually generate a body of knowledge fully as large, complex, and interesting as that which has grown up around magic squares. It is equally to be expected that a resolution of all the thorny problems created by the existence of number squares will require centuries of effort on the part of the ablest mathematicians and word experts.

Everything considered, we may, consequently, assert with confidence that word squares, by intruding themselves into the domain of numbers, are about to revolutionize mathematical recreations. In due course, it may well develop that the field of magic squares will be relegated to history as mathematicians, in ever increasing numbers, grapple with the new number squares.

Such, indeed, is the power of words. . . .

THE PART IS GREATER THAN THE WHOLE!

All of us know that each of our 50 States is within, and constitutes part of, the United States. Logologists, on the other hand, know that the entire United States is within, and constitutes part of, one of those 50 States. That State is the Creole State: Louisiana.

Note the symmetrical arrangement of USA within LOUISIANA: truly, an example of verbal artistry, and an elegant refutation of one of Euclid’s fundamental geometric postulates! Logology has triumphed again, but then, doesn’t it always?