Most of us have been accustomed to placing the entities in our lives, both mathematical and real, in spaces characterized by an integral number of dimensions. Thus, a line has one dimension, an area two dimensions, and a volume three dimensions. The Einsteinian space-time continuum has four dimensions, and some attributes of subatomic particles are most readily considered in spaces of six or more dimensions. Mathematically, it is possible to conceive of a space with an infinite number of dimensions.

Very recently, some scientists have come to the conclusion that certain objects, both mathematical and real, can best be considered as existing in spaces with a nonintegral number of dimensions. Examples of such objects observed in nature include terrestrial coastlines, cloud formations, Brownian motion, and stellar clustering. Objects possessed of this curious nonintegral dimensionality are called fractals.

(New as the word FRACTAL is, it has already acquired a prestige status in logology by becoming a transposition of the common word FLATCAR -- but that's another story.)

An interesting example of fractals is the terrestrial coastline. An ideal one, exhibiting a mathematical maximum of irregularities, can best be understood if it is placed in a space of 1.2618 dimensions. Actual coastlines don't measure up to this ideal, of course. Empirical studies by a British meteorologist, Lewis Fry Richardson, show that an actual ocean coastline has dimensions usually somewhere in the range between 1.15 and 1.25.

Closer to the realm of logology is the Zipf phenomenon in statistical linguistics. It can be shown that the statistical distribution of word frequencies in different languages is nearly universal and follows an empirical curve that depends on a certain exponent. This exponent can be treated as an index of dimensionality, and the number of dimensions represented by the exponent are a measure of the richness of the vocabulary in the language under consideration.

It seems obvious that the concept of fractals must have far-reaching applications in the domain of logology. It will certainly take many years and equally many brilliant minds to explore the new dimensions of logology in depth. The purpose of this article is to bring the discovery to the attention of all who might be interested in studying logical fractals, and to make a few preliminary suggestions about...
the phenomenon of nonintegral dimensions in logology.

Consider, first, the subject of word palindromes. An ordinary palindrome such as REFER is clearly one-dimensional. If it can be stood up and viewed from behind as well as from in front -- TATTAT, for example -- it is two-dimensional. If, in addition, it can be viewed upside down as well as right side up -- OXO, for example -- it is three-dimensional.

In the light of fractals, the foregoing analysis seems rather crude. What apparently ought to be done is to consider the number of dimensions possessed by each individual letter of the word, dividing the sum of the dimensions so obtained by the number of letters in the word, in order to arrive at the dimensionality of the word itself. Examined on the basis of this principle, LEVEL has 1.2 dimensions, DEIFIED has 1.429 dimensions, MADAM and SEXES each have 1.8 dimensions (though for different reasons!), and NOON has 2.5 dimensions.

Fractal palindromes are a seemingly static phenomenon. A greater degree of life is found in fractal transpositions. Here, adding dimensions to the individual letters of a word while transposing them requires turning them into a different position, converting them into other letters. For instance, WANDER is a transposal of REMAND because the W, turned upside down, becomes an M. Since only one of six letters has been shifted into a second dimension, this increases the dimensionality of the transposal to 1.167. Similarly, turning a Z sideways converts it into an N, permitting the transposition of ZENITHS into SINNETH (which seems like going from zenith to nadir!). Again, the letter M, turned sideways, becomes an E, allowing us to perceive MATES as a transposal of TEASE.

Words written in lower-case letters open the field to other equivalences. For example, a small b, viewed from behind, turns into a small d. This permits a transposal of EBON into NODE. In the same fashion, flipping over a small q converts it into a small p, and turning a small u upside down changes it into a small n. Combining the last two observations permits transpositions such as that of QUIETS into INSTEP.

Each of the examples quoted above involves a nonintegral dimensionality (1.143, 1.2, 1.25, and 1.33, respectively). It would be interesting to see what the highest dimensionality is that can experimentally be obtained.

From what has already been said, it is evident that the principle of fractals can immediately be extended to reversals, transdeletions, anagrams, and letter shifts. It will undoubtedly be possible, with a little more effort, to extend it to other areas of logology.

This is the first small step in entering an entirely new world of logology. What does the future hold in store for logological fractals?