Many of the articles which have appeared up to now in Word Ways begin with a theme, and then present various words which satisfy some criterion or criteria imposed by the theme. For example, in an earlier article of ours, "Zero Redundancy Rides Again", which was presented in the August 1970 issue, we began with a theme which was to compile a list of words ending with different two-letter combinations. Eventually we managed to find 595 examples. So: we began with a theme and ended up with 595 words.

For this article, however, we have decided upon a somewhat different approach. We thought it would be a novel idea to select one word from the English language and then see what themes could be developed around that word. Then, in the usual manner, we would embark on the search for various words satisfying the relevant criteria imposed by each of the themes. As the title of this article may have already indicated, the word we chose as the starting point for our studies was CAROLINE. (Coincidentally, the same eight letters were used by Dmitri Borgmann in Problem 26 (A Magic Circle) in his book Beyond Language.)

Before going any further, let us see what the word CAROLINE itself means. CAROLINE can function both as an adjective and as a noun. As an adjective it means 'relating to someone called Charles, Carolus, or Charlemagne'; this is used especially with reference to King Charles I and King Charles II of England, King Charles I of Spain and Charlemagne, king of the Franks. As a noun, CAROLINE is an Austronesian language and a type of hat. It is also a feminine proper name. CAROLINE, as a name, has been applied to many geographical entities. Some are reasonably well-known, like the CAROLINE Islands in the Pacific; others are not so well-known.

Having indicated what CAROLINE means, what can we do with the word? Our first thoughts are of transposing it, juggling the letters around to create other words. After a little research we came up with a total of eleven genuine transposals, which we have listed below.
Most of these words can be found in either the Second or Third Editions of Webster's New International, or Funk & Wagnalls New Standard Dictionary. In fact, we shall draw extensively on the word-stocks of these three dictionaries in this article. Any word which we use which is not to be found in one of these three dictionaries will have its source specifically identified. After each such word will be a number, this number indicating the exact reference—all references being detailed at the end of the article.

In the above list of CAROLINE transposals, we took CORALINE from reference (1) and NACLERIO, a surname, from reference (2). All the other words can be found in at least one of the aforementioned dictionaries.

Another theme involving CAROLINE is that of successive alphabetical transaddition. Here we try to add each of the letters of the alphabet in turn to CAROLINE, and then transpose the resultant nine letters to give a genuine word or name. For this theme we must thank Dmitri Bargmann, who not only suggested it but also helped find many of the words involved. Our list is not complete, and additions from the reader would be most welcome.

A - ARENICOLA  J - ARENICOLI  S - CENSORIAL
B - CLAIBORNE  K -  T - ALECTRION
C - LANOCERIC  L - COLLINEAR  U - URCEOLINA
D - COLLIANDER M - MARCELINO V - CORALVINE
E - ARECOLINE  N - CORNELIAN W - CORNWAILE
F - FALCONRIE O - X -
G - RECOALING P - PORCELAIN Y -
H - ENCHORIAL Q - Z - LACONIZER
I - ARENICOLI  R - CAROLINER

ARENICAL can be found in reference (5), and CORNWAILE in (4).

Having added letters to CAROLINE, let us now progress to deleting them. Specifically, let us search for Baltimore transdeletions. According to A Key to Puzzledom (Press of Duane Powell, Dowagiac, Michigan, 1906), this term was coined by L.M.N. Terry in 1904. A Baltimore transdeletion is effected by subtracting each of the letters of CAROLINE in turn from CAROLINE, and then transposing the seven remaining letters to get a genuine word or name. This is exactly the same thing as attempting to find transpositions for all possible seven-letter combinations of the letters in CAROLINE. Our best effort was with the letters acelno.

Can any reader improve on this for the two remaining letters acelno?

Before the final filing of words, as the combinations of nations of words will have taken place; please refer to the list; please refer to the list; please refer to the list.
best efforts are presented below:

CAROLINE - C  AILERON, ALERION
CAROLINE - A  CEROLIN, LOCRIEN
CAROLINE - R  COELIAN, ELACION
CAROLINE - O  CARLINE, CLARINE
CAROLINE - L  OCNERIA, CAROINE
CAROLINE - I  CALERON, CORNEAL
CAROLINE - N  CALORIF, COALIER
CAROLINE - E  CLARION, LOCRIAN

CAROLINE is found in reference (1). Note that CALERON is listed away from its strictly correct alphabetical position in Funk & Wagnall's. To observe the word printed in its full majesty, the reader will have to turn to CALEAN, of which it is a variant form. There are many alternative words that we could have placed on this list instead of the ones actually presented. Perhaps the reader would like to search for them.

Since we have successfully managed to find genuine transpositions for all seven-letter combinations of the letters A, C, E, I, L, N, O and R, let us see if we can find genuine transpositions for all six-letter combinations. We could call this a double Baltimore transdeletion since all possible two-letter combinations are to be subtracted from CAROLINE. Our results:

acein: ALCINE  acenor: CORNEA  aelnor: LOAER
acello: COELIA  acelro: OICLAN  alinor: LORAIN
acelir: LACIER  acelor: CRINAL  celnor: ENOLIC
aceino: ACOINE  acelirn: LORICA  cellnr: CLINER
acelin: CEARIN  aclinr: CRONIA  cellnr: RECOIL
acelir: LANCER  acliren: OICLRN  celinr: LIRON
acelor: ORACLE  aelirn: AROILE  elinn: LIENOR
aeinr:
EOIAN and AORNE are in reference (3), ACOIE is in reference (5), and LORIN is in reference (6). To be absolutely precise, the word LINAC is ‘to be found in the addenda section of Webster’s Third Edition. It is short for LINEAR ACCELERATOR. And, for the uninitiated, LORIN is the name of a Canadian lake.

We are not going to search for quadruple Baltimore transdeletions here. That is a task which we shall leave to the reader, though we would like to see any nearly complete list of such words derived from CAROLINE. Are you up to the task?

Up to this point in the article, we have juggled the letters of CAROLINE, we have added letters to CAROLINE and then juggled them, and we have subtracted letters from CAROLINE and juggled what remains. It is now time for us to subtract letters from and add letters to CAROLINE at the same time. Since for each of the eight letters that can be subtracted from CAROLINE there are 25 that can be substituted in the place of the subtracted one, there are theoretically 8 x 25 (or 200) different substitute letter combinations. For how many of these combinations can we find transpositions that are real words or names? In the list presented below, we have found examples for 100 (or one-half) of the combinations. We trust that the reader will be only too willing to help us improve on this figure. Each of the words in the list is preceded by two letters. The first of these indicates the letter which has been subtracted from CAROLINE, and the second letter indicates the letter which has replaced it.
Now let us investigate the curtallment properties of CAROLINE.

Curtallment is the removal of the last letter of a word so that a new word is obtained. CAROLINE is curtallable right down to one letter. All of the words involved in this curtallment can be found in Webster's Second Edition. Is it possible to extend this curtallment in the other direction? That is, can we add a letter at the end of CAROLINE to get a word or name? We can indeed. We could add either an
Neither CAROLINER nor CAROLINES are words. Unfortunately, we cannot extend the curtailment any further. As CAROLINER is a plural, we cannot tack on an S to get CAROLINERS. Of course, if the reader can confirm that some reference work lists CAROLINER as a singular (meaning, possibly, someone from either North or South Carolina), then we shall be only too pleased to extend the curtailment upward to include CAROLINERS.

If we look carefully at the word CAROLINE, we can see that consonants and vowels alternate in the word. This means that if we select any two adjacent letters, we will have one consonant and one vowel. What possibility is there that the consonant and vowel selected will be a genuine two-letter word? It needs only a little checking to establish that all adjacent consonant-vowel and vowel-consonant pairs are words. CA, AR, RO, OL, LI, IN and NE are all members of the English language (OL can be found in reference (1)). If we reverse all of these two-letter words we still end up with seven genuine words. AC, RA, OR, LO, IL, NI and EN are all dictionary-listed words. Having shown that any two adjacent letters of CAROLINE, taken in any order, constitute a word, is it possible for us to demonstrate that any three adjacent letters will likewise constitute a word? Yes, of course it is! Without too much difficulty we can confirm that the following are all words with a 100% reputation:

CAR ARO ROL (6) OLI (3) LIN INE

For those readers who don't have instant access to the two less easily checkable references indicated here, we shall mention that ROL is the name of a town in India, and that OLI is an obsolete variant spelling of the word oil. Just as we were able to spell all of the two-letter words backwards and get real words or names so, too, can we spell these six three-letter words backwards and arrive at real words or names. Thus:

RAC (3) ORA LOR ILO (6) NIL ENI (3)

ENI and RAC are obsolete variant spellings of any and rack: ILO is the name of a town in Peru. At this stage the reader is probably wondering whether any four adjacent letters of CAROLINE spell a word. To put the reader's mind at rest, we shall indeed confirm this. All of the following are known words and names:

CARO AROL (7) ROLI (6) OLIN (5) LINE

ROLI is a place in India, and OLIN is the surname of a 19th century American Methodist clergyman. When we first attempted to verify AROL as a word or name of any sort we ran into trouble. We just
Unfortunately, CAROLINES of New York lists it from either extended to extend con-
and one vowel select-
e checking consonant (all members (c), If we re-
whole four-letter-listed CAROLINE, 
stitute a word we can spell: above:

If less than five letters, complete vari-
all of the words, too, to arrive at 

If we allow ourselves to accept a somewhat questionable word, then the transdeletion on the right could be extended upwards by two levels. If we add an A to INTERSECTIONAL and juggle the letters, we can create ANTI-SECRETIONAL, which is an excellent coinage. It is a crying shame that no dictionary lists this magnificent term. If we then add a D to ANTI-SECRETIONAL, we can transpose the let-
ters to get DECENTRALISATION. This word we find in a small Brit-
ish dictionary entitled Chamber’s Twentieth Century Dictionary. The Webster dictionaries spell the word as DECENTRALIZATION, as does the Century Dictionary. And while Funk and Wagnalls gives CEN-
TRALISATION, it doesn’t go on to give DECENTRALISATION. Any-
way, even if we hadn’t found any dictionary at all which listed DE-
CENTRALISATION, we would have presented it here as a genuine word, as its existence can easily be inferred from the related dictionary entries.

What next? We thought that it might be worthwhile to construct a series of successive transdeletions involving CAROLINE. Two such series are presented here, both starting from 14-letter words. Can the reader find a series starting at the fifteen level? There is one.

14 COUNTERSALIENT INTERSECTIONAL
13 INTEROSCUULATE INTEROSCIOTAL
12 INTERLOCATES INTERCOSTAL
11 INTERCOSTAL INTERCOSTAL
10 CLARIONETS CLARIONETS
9 CROTALINE SARCOLINE
8 CAROLINE CAROLINE
7 AILERON CORNEAL
6 NAILER RELOAN
5 LINER ALONE
4 NILE LONE
3 LIE ONE
2 EL ON
1 E O
We have just about exhausted the results of our research involving CAROLINE. There is a lot more that could still be done. We shall indicate one or two areas of research which we think may be profitable to investigate. Perhaps, if any reader undertakes such an investigation, he will pass on the fruits of his research to the editor.

The reader may care to search for words which are transposals of any seven letters of CAROLINE with any two other letters added. COTARNINE (adding N and T, subtracting L) and CORALLINA (adding L and A, subtracting E) are just two examples. Or the reader may like to search for words formed by transposing all eight letters of CAROLINE and any two other letters. CORELATION (adding T and O) and PROCOELIAN (adding P and O) are two examples. How many three-letter words can the reader find which use the letters of CAROLINE? Are all the vowel-consonant arrangements of the letters in CAROLINE genuine two-letter words? And so on and so on ...

REFERENCES

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6. The Times Index-Gazetteer of the World, 1965
7. Geographicus Indicus, J. Frederick Baness, 1881