Introduction to the

HEADLINE PUZZLE

by Paul Derthick

April 1978

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January-February 1965: The following are all headlines from a recent daily paper.
Each of the five is a different letter-for-letter substitution. All five are
derived from the same mixed alphabet at different settings against itself.

1. XBBWGPLSF QSYKSP RGWKAKBMW LKBLNMBL RWGA
2. KFRXZG NTZYN YBFHL KRIO PH NYRZL
3. RQKXY OCPHDCB EXSC WYCC-PHCKS TYPWS
4. PONPNM MAZ ZC PIOEEAJBA IOEEAPF
5. JSRDYA IAC DQIIP WYRC AIUY UIRP

April 1966: The following are all headlines from a recent daily paper. Each of
the five is a different letter-for-letter substitution. All five are derived from
the same mixed alphabet at different settings against itself.

1. CJVYCOSQ YOBYBRSR 'IBUMXEUVSUM HEMCBJM ERBPXMEBU' YBPEIQ
2. EJTSOFYWVF EBOYST WOB WV DVFF JFI AVFIVF EOWSOF FJWV
3. UZLXNG AZSANPNU LNSRU UWIANAJITG TIXDRJNU
4. YMKRZMB WDKQDP PGQYL ZMEL-OYKGL EWKJLOQPXP
5. NGSVQR SLGAFGL KVYBMNLFP JGEN YR FMNPMGKFBM BLAR

March 1970: The following are all headlines from a recent daily paper. Each of
the five is a different letter-for-letter substitution. All five are derived from
the same mixed alphabet at different settings against itself.

1. JRMEZYMJ GQCYMSGO URHJEYM MQCQURBB OUZRRG UMQEQUQOI
2. HZKNOSH HOOQ MOHS GOXDNF SUDQH MNSYNF SYXOO MOOQH
3. LPJEIG YUQUDCT QEJ EN LYGNC LPYUDCEY
4. SPT WECSUY TAWWEIT XYPIDU DSGYFUT CE XGYFPGWUIC
5. YPRDK DIEXLP QREEK IU WVP HGY HIRQO WQGYYPQPO HK QXLIQM

January 1978: The following are all headlines from a recent daily paper. Each of
the five is a different letter-for-letter substitution. All five are derived from
the same mixed alphabet at different settings against itself.

1. YQUWRIWNIEVNMN'E 'YCIE NMH UCAFAE' YAFQPA CMHAUAMHAMI
2. BDGLPG BTJZKC YB OTZKJZYJZS BDTNHFX JZ BDTLJPJZS STTPC
3. MZYRZRY AB SZZXS GA WAQMGPO UZQZRY OPTMSZR WUXSBZPQT
4. ZMOWXJXAXBNX GZO OC HBECVR ECW PCTXGGX Q
5. TFQTYKOUKHSR BVOOVBQEWO PQEQD PVCYWO TSANSVCE

The preceding puzzles appeared in the Newsletter on the dates indicated. Note that the instructions for the puzzle have never varied, yet each of these puzzles is an example from "major" changes in the manner of constructing the mixed alphabet. There have been, and are, "minor" changes in the other steps of the puzzle, which can occur at any time, and are (hopefully I say!) a little challenging and frustrating.

The puzzle was planned to have the widest appeal possible and there are almost as many approaches to it as there are those interested. I have known some very good brains who were challenged only by the headlines, and at least one who preferred to struggle with a pattern like ABCDEFGDABCE rather than tackling the shorter words. And I have also known some very good brains who thought the puzzle too easy, despite the ramifications in the cipher processes, and that has been one of the reasons for changes, to sustain interest. I give you a caveat

The use of headlines was a happily malicious thought. It permits the inclusion of outrageous proper names, and has a tendency to exclude the commonest words. The five most frequent words in English are THE, OF, AND, TO, A; of these, due to the condensed nature of headlines, THE and A are almost always omitted with AND being replaced by a comma, frequently. On the other hand, headlines exhibit their own frequencies with words such as SAYS, REPORT, HOLD, SET, OPPOSE, etc. The first word is an attention getter, and one to be leery of, unless you are looking for a pattern as in CARTER, NIXON, CONGRESS and the like. The interrelationship of the five headlines also makes it less important that each letter be repeated as in the usual cryptogram. I look for headlines with a fair repetition rate and rarely change a word to repeat a key letter. Most headlines come from the Sunday New York Times, but I have used both Washington and Baltimore papers. I do not save up headlines that are stinkers--I'm too lazy for that--and the quality of the puzzle suffers from my usual rushing to meet a deadline. I have special dispensation from the Newsletter to submit the puzzles later than most, but, at best, the headlines are four to five weeks old to the solver. One discovers that yesterday's headliners are often today's nonentities. One of the headlines is almost invariably from the sports page and all of them have the least expected words that I can fine in haste, including a rare THE or AND.

Unless that is the way you prefer, do not sweat on each headline in turn, but look for the shortest words or best patterns in them all. With luck and effort, the solution of one headline can be of help in solving the second, but, in general, it is easier and more profitable to solve at least two headlines before attempting to construct the mixed alphabet. In a rare case, you may have a problem after solving all the headlines. Years ago, Liz Stephens said she just hated me because all five headlines produced even decimations of the mixed alphabet and split into two 13-letter sequences! It was an unjust

accusation, for, although delight in pulling a dirty trick occasionally, the long arm of random is the culprit. I select words on which to base the cipher steps for length, uniqueness of letters, or even obscurity, etc., and for their relationship to each other, and do not worry about what they are going to produce in the puzzle, except for identity encipherments and unprintable Anglo-Saxon.

Before I go too far for the uninitiated, let me explain what I intend to do. I will work out the January 1978 puzzle at the beginning of this paper, which is an example of the current puzzle. The initial steps are applicable to all past, and, probably, future puzzles. And I will explain the distinctions from the current puzzle in the earlier examples, and let you work them out for yourself. All this in order that you may be prepared to anticipate changes when, damn it, one puzzle doesn't work like the last one. Back in 1966, Frank Lewis produced a paper on a puzzle similar to the April 1966 1 have listed, and Walt Jacobs published a computer approach in the Agency journal, both of which you may want to pursue.

Looking at the January 1978 puzzle, probably the two headlines 2. and 3. would succumb to effort first, since an assumption of OF and TO in 3. would be correct, and it wouldn't take long to spot IN, the third most frequent two-letter word, in 2.

    2.BDGLPG BTJZKC YB OTZKJZYJZS BDTNHFX JZ BDTLJPJZS STTPC
      PRAVDA POINTS UP CONTINUING PROBLEM IN PROVIDING GOODS

    3.MZYRZRY AB SZZXS GA WAQMGPO UZQZRY OPTMSZR WUXSBZPQT
      SIGNING OF KIICK TO BOLSTER AILING REDSKIN BACKFIELD

Since the encipherment is by sliding a mixed alphabet against itself to a fixed position for each headline, we know the cipher and plain pairs BP, DR, GA... in 2. are composed of letters which are a fixed distance, x apart in the mixed alphabet. In 2. we find pairs BP, PD, DR and we can chain them into the sequence BPDR, which are letters at a decimation of x of the original alphabet. All the chains from 2. give us:

    ZNBPDR
    KTOCSGA
    HLV
    JI
    YU
    FE
    XM

Similarly, the pairs in 3. are a different fixed distance, y, apart in the same mixed alphabet, and the chains are:

    MSK
    ZI
    YGTD
    UAORN
    WBF
    XC
    QL
    PE

Since the chains from 2. and 3. are decimations of the same original alphabet, it follows that they are decimations of each other, and we can convert the information from one into terms of the other. The first chain from 2. and the fourth from 3. both contain letters R and N and we can combine 3. with 2.:

     ZNBPDR...O...A...U

then add further chains from 2.:

     ZNBPDR.KTOCSGA..YU

go back to 3.:

     I.FEZNBPDRWKIOCSGAXMYU etc.

and with beginner's luck (I work very few of my own puzzles) we get a complete sequence of 26 letters:

     HLVJIQFEZNBPDRWKTOCSGAXMYU

The usual case will probably not produce a complete alphabet from just two headlines, but it will be complete enough to be useful in solving the other headlines. All you have to do now to finish the headlines is prepare sliding strips and immediately check your assumptions, or decipher a cipher word at all settings looking for something that makes sense. The fact that this alphabet is a decimation of the original makes no difference.

As a matter of fact, we were doubly fortunate in the above alphabet; we could have ended up with two 13-letter sequences--only the fact that 2. is an odd decimation of the original alphabet saved us, for 3. is an even decimation. Completing the headlines, one finds that only 2. and 4. are odd decimations. If your sequence splits into 13's, you have no way of knowing the proper interweave, and the best thing is to tackle another headline, looking for an odd decimation.

The settings of the alphabet strips for the five headlines are:

Cipher	HLVJIQFEZNBPDRWKTOCSGAXMYU
Plain 1.	DRWKTOCSGAMCfUHLVJIQFEZNBP
2.	LVJIQFEZNBPDRWKTOCSGAXMYUH
3.	XMYUHLVJIQFEZNBPDRWKTOCSGA
4.	UHLVJIQFEZNBPDRWKTOCSGAXKY
5.	VJIQFEZNBPDRWKTOCSGAXMYUHL

To this point, the approach to all my puzzles is identical, and some may happily have quit. But the curious will have noticed under the cipher letter Z above that the plain spells BEING, from bottom to top--a setting word. The question as to where the mixed alphabet came from remains.

Let us look at the alphabet:

```
HLVJIQFEZNBPDRWKTOCSGAXMYU
```

If it is based on a keyword, uncommon letters in the alphabet have a tendency to remain sequential. In this we note that the sequence UVW is followed at a distance of 1 by the sequence HJK, respectively. (The distance of 1 is purely fortuitous, since I do not control it, and it could be any number.) Write these down as the beginning of a keyword box:

```
HJK                    (Note that if the distance is something
UVW                    other than 1, decimate the alphabet at
                       that distance before starting.)
```

and add other portions:

```
LITYB
HJKMN
UVWXZ
```

recognizing the end of a keyword, and producing:

```
REALITYBC
DFGHJKMNO
PQSUVWXZ
```

If we assume that the letter Z, under which the setting word BEING occurs, is the beginning of the original sequence, which it always has been, we write:

```
ZNB  PDR  WKT  OC  SGA  XMY  UHL  VJI  QFE
1    2    3    4   5    6    7    8    9
```

splitting the alphabet into columns from the keyword square, reading bottom to top. The order that the columns were taken from the keyword square is:

```
2 9 5 7 8 3 6 1 4
R E A L I T Y B C
D F G H J K M N O
P Q S U V W X Z
```

(5)

This order for removing the columns is called a hat, and is the alphabetical order of the letters from a third word related to the setting: BEING, and the key: REALITY. To solve it, write:

```
2 9 5 7 8 3 6 1 4
B E C D D B C A B
C F D E E C D B C
D G E F F D E C D
E H F G G E F D E
F I G H H F G E F
G J H I I G H F G
H K I J J H I G H
I L J K K I J H I
J M K L L J K I J
K N L M M K L J K
L O M N N L M K L
M P N O O M N L M
N Q O P P N O M N
O R P Q Q O P N O
P S Q R R P Q O P
Q T R S S Q R P Q
R U S T T R S Q R
S V T U U S T R S
T W U V V T U S T
U X V W W U V T U
V Y W X X V W U V
W Z X Y Y W X V W
```

a display which defines the limits for each position. Note that the only possible A in the word is at 1; that 2, 3, and 4 can all be B; that if 3 is B, 2 must also be B, but 4 could be C, etc.; and that if 4 is B, 2 and 3 must also be B. Similarly, if you assume 1 is C, then 2, 3, 4 can at earliest be D., etc. Likewise, 9 is the only possible Z, and 7 and 8 can at most be Y. The hat word turns out to be EXISTENCE. It is possible that many words fit this pattern and you must find the one that associates with the setting and key words; however, for a 9-letter word it is surprising how unique the answer will be. The shorter the word., the more answers that are possible.

I have never used a hat shorter than 7 letters, the setting words, are always 5 letters, and the key can be any length, but will always be unique letters. They are always related, but it may require some cussing and research to find out how.

(6)

This January 1978 puzzle was an exception to my usual lazy habits. Note that if I had taken the columns out of the keyword square from top to bottom, the mixed alphabet would have started with letter B, at the benchmark where the sliding strips are set. With the setting word BEING, I had to do something to prevent the first (or any) headline from producing an identity encipherment, so I reversed everything. More frequently you will find the setting word reading from top to bottom, in alphabets with the plain on top and the cipher inside.

The earlier puzzles I have listed will give you some of the evolution of the process and may be some fun in trying to remember headlines of those dates. The January-February 1965 puzzle was one of the earliest, back when the Newsletter was born. It uses a straight keyword alphabet and 5-letter setting, such as:

                CASTLEBDFGHIJKMNOPQRUVWXYZ   REGAL

The April 1966 puzzle would scramble the keyword sequence using the alphabetical order of the setting word:

                        REGAL

                        52314
                        CASTL
                        EBDFG
                        HIJKM
                        NOPQR
                        UVWXY
                        Z

to give   TFKQXABIOVSDJPWLGMRYCEIWUZ

The March 1970 puzzle is a type that produced some doozies---John Ferguson still hasn't recovered from SPADINGFORK. It would scramble in this manner:

                        REGAL

                        52314
                        C A S
                        TLEBD
                        FGHIJ
                        KMNOP
                        QR UV
                        WX YZ

to give

                  BIOUYLGMRXAEHNSDJPVZCTFKQW

where the box was shaped like the keyword. Obviously, this has its limitations, and the current-puzzle was a relief to everyone, including me. Now that I have explained it all, I must dream up a new twist. Happy head scratching!

(7)