

10-BY-10 SQUARES: PROGRESS REPORT

FRANK RUBIN

Wappingers Falls, New York

In the August 1988 *Word Ways*, I wrote about my plans to launch a computer attack on the 10-by-10 double word square. I asked for help from *Word Ways* readers who might help gather 10-letter words from dictionaries and other sources. I received only one reply, from George H. Ropes, who had just written an article on his own search for a 10-by-10 word square. He had the Air Force word list from Webster's Second on diskettes, and graciously supplied those diskettes to me.

This was enough to get started seriously. Merging the 41,000 or so words from the Air Force list with the 6,400 words I had typed in myself gave me nearly 45,000 words, after eliminating duplications.

I began running my program on July 11, 1988. I had a good number of adjustments to make in deciding which partial squares to record. At first, I recorded every 5,8 square -- that is, every square with 5 valid words reading in one direction, and 8 valid words reading in the other direction. However, after a few days I had over five hundred 5,8 squares and one hundred 5,9 squares. If I continued to record all of these partial squares, the computer's disk space would be overrun.

I erased all of the 5,8 squares and 5,9 squares from the computer file, and continued recording all 5,10 squares. Here are the first 5 such squares that I found:

ABSCONDERS	ACTOMYOSIN	ACTORPROOF	ARBUSCULAR	ADUSTIOSIS
BATONISTIC	BARBITURIC	BARBECUING	BEANPICKER	BERTHCARGO
ALINEATION	ANESTHESIA	ANESTHESIA	ALLSHAKING	APORETICAL
LATISEPTAL	NONTITULAR	NONTOURIST	SALTARELLA	SIMILARITY
INCREASING	DECIGRAMME	DECINORMAL	ETHICALISM	ELEGIAMBIIC
ECHOPRAXIA	OCHNACEOUS	OCHNACEOUS	DIAPEDESES	MALIGNANCE
NEWSTELLER	NEMATELMIA	NEMATELMIA	NONPLASTIC	ETALONPOST
APOTACTICI	IDONICACID	IDONICACID	ENDLICHITE	NONANALOGY
TIRETURNER	NARCOBATUS	NARCOBATUS	SALESAGENT	TRITURABLE
ENTREASURE	GREENALITE	GREENALITE	SLEDMARKER	SYNEMMENON

By the time I had searched through the word list as far as ABORT-ICIDE, I had 25 such 5,10 partial squares, and stopped recording them. I estimate that about 1,000 such squares would have been recorded as of this progress report, and 50,000 of the 5,8 squares.

After running for 8 days, during which only about 30 words were processed, I began to realize that the search was going to take

well over 20 years. I wanted a faster way. So I wrote a modified version of the program that searched only for (approximately) symmetric squares. Of these, I recorded only those that reached level 8,8 or better. This symmetric search took just 4 days. Only 4 such squares were found, plus some minor variations:

ACCOMPLICE	BRACHERING	PESTICIDAL	PRECHOROID
COOPERANCY	RETRORENAL	ETHANAMIDE	RETROVERSE
COPATENTEE	ATHEROMATA	SHORTLIVED	ETHANEDIOL
OPALESCENT	CRESOTINIC	TARHEATING	CRATERLESS
METENTERON	HOROLOGIES	INTERMASON	HONEYCOLOR
PRESTATION	EROTOPATHY	CALAMITIES	OVERCOOLLY
LANCETOOTH	REMIGATION	IMITATIONS	REDLOOKING
INTERIONIC	INANITIONS	DIVISIONAL	ORIELLIPSE
SCENOOTI	NATIEHON	ADENOENA	ISOSOLNS
HYETNNHC	GLACSYNS	LEDGNSSL	DELSRYGE

I resumed the search for a double word square on July 24, disappointed that I had not found any squares beyond 8,8. I continued to make small improvements in the program over the next few weeks. At the same time, I was adding a few words at a time from the Webster Pocket Dictionary.

By late August, I hit a dead end. The computer no longer had room in its memory to hold the complete word list. Over the first weekend in September, I completely rewrote the program. I not only increased the word list capacity by another 10,000 words, but I made the program 50 per cent faster.

This reduced the estimated running time from 22 years down to 15 years -- still not fast enough. So I changed the program to search only half of the possible word squares. This reduced the time to 7 years, but it removed an important check on the correctness of the program. With a full search, many of the squares would be generated twice, as mirror images. This provides verification that the program is not skipping any valid squares. With the half-search, this check is lost. No square could be generated more than once.

By early November of 1988, the program had searched about 2200 words of the word list, through the word APOTHECARY. The computer found 2038 squares at level 6,6, 205 squares at level 6,7, 28 squares at level 6,8, and 5 squares at level 7,7 (not counting minor variations). Here are the five 7,7 squares:

ACTIVELIST	AFFORESTED	AMELOBLAST	ANASTATICA	AORTARCTIA
CYANOMETER	FLORENTINE	MONOCOELIA	NONEUGENIC	OVERWEIGHT
TARTRAMATE	FORTPIERRE	ENUMERABLE	ANTANANDRO	REVILINGLY
INTRACOLIC	ORTHO CERAN	LOMBARDEER	SEALETTUCE	TRIGENERIC
VORAGINOUS	REPOPULATE	OCEANOLOGY	TUNELESSLY	ASSESSMENT
EMACIATING	ENICURIDAE	BORROWABLE	AGATESHELL	REINSTATOR
LEMONTREES	STEELINESS	LEADLAPPED	TENTSHAPED	CATENATION
ITALOIE	TIRRADE	ALBIOBP	INDUSEP	TSARETI
SETIUNE	ENRATAS	SILAGLE	CIRCLLE	IONISOC
TRECSGS	DEENEES	TAENYED	ACOEYLD	ANTCSRS

The only 7,8 squares found were degenerate variations on the 8,8 symmetric squares presented earlier.

At this point, I decided to run the program on my word list with the words spelled in reverse, thus building squares from the bottom up instead of the top down. A rerun of the symmetric square search produced some hundreds of 8,8 examples, far more than the four I had previously located. More importantly, I quickly discovered some twenty 6,9 double word squares as well as the following 6,10 double word square:

CASCADEFIR
 MEGACERINE
 PRECEDENTS
 PLASTICART
 ANTHOCHLOR
 ORDINATIVE
 PELLETIZES
 DELIMITERS
 TERGIVERSE
 REACCESSED

I now plan to run the program exclusively with the reverse word list.

If there are **Word Ways** readers who own or have access to an IBM or compatible PC with at least 640K of memory and who are willing to run part of the search, a parallel effort would allow the ten-square search to be completed far sooner. I also seek anyone willing to hunt for words to add to my list, now over 50,000. If you have a compatible computer and can type the words into the computer, that is best, but even if you merely list the words on paper for me to type, that would be a benefit. If you are willing to help either with word-square searching or word-listing, please write to me at 59 DeGarmo Hills Road, Wappingers Falls NY 12590.

QUERY

Richard Lederer of Concord, New Hampshire labels pairs such as raise-raze or wreckless-reckless homophonic contronyms (pairs of words that 1) sound exactly alike, 2) are spelled differently, and 3) possess clearly opposite meanings). Has this category been previously identified by logologists? Can you supply additional examples?