This is the third of a series of articles on directed word chain networks; the first two can be found in the August 1991 *Word Ways*. Specifically focusing on (8,4) word chains, it is divided into two sections. The first introduces a two-dimensional construction called a mesh; the second updates and extends Part 2, using an enlarged word list. All terms are defined in Part 1.

As described in Part 2, the original list of 2813 words containing 960 different frags was taken from a computerized Official Scrabble Players Dictionary database, augmented by a hand search of Webster's Second and Third and Chambers Twentieth Century Dictionary for eight-letter words suitable for long chains. Since the earlier article, further searches of Webster’s Second (plus an exchange of lists with Christopher McManus) has resulted in a list of 6191 words (a 120% increase) with 1394 different frags (a 45% increase). Note how few new core frags accompany the large increase in words; the original search fairly well established the core. The frag types are tabulated below ("other" frags consist of preceders and followers, both defined in Part 1):

<table>
<thead>
<tr>
<th>Frags</th>
<th>Core</th>
<th>Beginner</th>
<th>Ender</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 2</td>
<td>960</td>
<td>507</td>
<td>119</td>
<td>142</td>
</tr>
<tr>
<td>Part 3</td>
<td>1394</td>
<td>659</td>
<td>205</td>
<td>181</td>
</tr>
</tbody>
</table>

**Meshes**

A mesh is a rectangular array of frags from word chains arrayed in rows and columns and interlocking in the manner of a word square. Below are samples of the largest meshes I could find using a microcomputer. Read the frags pairwise from left to right and from up to down; all eight-letter combinations are solid words. These large meshes have a more or less common theme, so only a few are shown. I was not quite able to complete any 6x6 meshes; both 4x9 and 6x6 meshes use 36 frags, but more intersection is required in the latter. Quite a few 5x7 meshes are possible.

- fore-body-surf-fish-hold-over-long-hair-bird
- play-work-boat-tail-back-fire-wood-worm-seed
- down-hand-bill-head-wind-ball-cock-weed-like
- town-wear-able-gate-ward-room-mate-less-ness
- lower left corner
- alternates: side-lock, side-line, pipe-line, land-lock, land-line

- fore-hand-line-side-long-wool-ball
- hold-fast-back-bone-wood-rock-weed
- over-land-wash-tail-wind-fish-hook
- fire-lock-work-head-ship-worm-like
- plug-hole-able-gate-ward-less-ness
- lower left corner
- alternate: cook-book
- shop-lift
PART 3)

word chain

Word Ways, divided into construction 2, using an
word types containing the earlier dictionary of Word
an exchange list of 6191 words; a tiny fraction of these are listed in the
appendix. All of them shown have variations. Most meshes of any
size begin with fore or over and end with like or less converging
to ness; however, the appendix samples show such variety.

More than half a million 5x5 meshes can be constructed out of
my 6191-word database; a tiny fraction of these are listed in the
appendix. All of them shown have variations. Most meshes of any
size begin with fore or over and end with like or less converging
to ness; however, the appendix samples show such variety.

Updates

The one-way span of the (8,4) directed word chain network has
been reduced from 17 to 16, but otherwise has the same character.
As in the earlier article, the central portion of the core contains
common four-letter word frags, but many of the frags at the begin­
ning or end are non-words (or, possibly, obsolete spellings in the
OED). The portion of the core following the span is an example
of a beginning sequence using mostly non-word frags.

Although it is possible to create very long (8,4) chains, it is
more challenging to find chains of a specific length between stated
ends. With a computer, I have gone one step further. In the follow­
ing word to ways chains, wordster, wordplay and wordbook are
used as often as needed, but otherwise no frag is repeated in this
set. The series is not optimized; a longer set is possible. Recogniz­
ing shipable, rockling, overshoe, and roadster, note how easy it
is to combine portions of these chains into one long one. Further­
more, new sections like hand-clap-trap-door-post-lude-rick-yard­
land, etc., can be inserted here and there.
Here are explanations of a few of my favorite eight-letter words:

a foreiron (Web 3) is not a golf club but part of a plow; a cockhead is not an upside-down cocktail but the stem of a grinding wheel; bearfoot (Web 2) is an herb; tailhead (Web 3) is the base of an animal's tail; burnover (Web 3) is an imperfectly-burned brick; hightide (Web 2) is a festival; a bookmate (Web 2) is a schoolmate; downgone (Web 2) means downcast or unhappy; gonesome (Web 2) means having a gone feeling; a workboat (Web 2) is indeed a boat; workship (Web 2) is a variation of workmanship; a landship (Web 3) is a large covered wagon; bookland (Web 3) is not a place to read books but the opposite of folkland (Web 3), a legal term regarding landholding; likewalk (Chambers) is an alternate of latewake or lake (Web 3), simply a wake; cone-apat or cone-patl (Web 3) is a Mexican name for an animal commonly known as a hog-nosed skunk.

Part 2 gave a list of reversible words (such as bookcase and casebook). This list, given in the appendix, is now 150 words long with 91 different frags represented. All 91 frags are core frags and common four-letter words. 56 of these constitute a core with bidirectional links as in the standard Carrollian word network.

This core is shown below; it has a span of 16:

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| long | wash-dish | boil, hang, hold, pass, slip, walk, wing |
| note | book | folk | play | burn-side-kick, stop, hill, line |
| dove-ring-head | work | hand | mark-down | over | wood | worm-root |
| skin | ship | fast | face | haul-back-fall-fish | pond | bone-tail |
| rail | shop | come | | | coat |
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Other aspects of (8,4) chains are incorporated in the following two puzzles:

PUZZLE 1: Using only the 28 four-letter frags listed below, how
many 4x4 meshes can you construct? All eight-letter combinations must be listed as solid words in either Web 2, Web 3, OSPD or Chambers. A frag may not be used more than once in a mesh.

back ball band bell bone door dove fast fire fish hand head hold lady land like long ring ship side skin star tail wash wash wood worm

PUZZLE 2: Fill a blank with an eight-letter word so as to make two more eight-letter words. There might be more than one way to fill each blank. The frags of a fill-in word need not be words.

A. boat_____ ship B. back_____ side C. head_____ tail
sample: tailwind stopover stopover longhorn
D. bookmark_____ dingbats E. pinafore_____ dateable

APPENDIX

backfall backfire backhaul backkick backstop bandtail barabara birdcage birdseed birdsong boilover bonefish bonetail bookcase bookland bookwork bootjack buckbush burnover burnside bushbuck bushwood cagebird caracara casebook cowchow coattail comedown couscous deerkill dishwash dividivi downing downcome downface downplay downtake downturn downwash facedown fallback fallfish fastland folkland ganggang gangplow greegree handwork hangover hardpans haulback haulover headland headnote headtail headring headskin headwork hillside holdover hometown hookweed hotshots jackboot kavakava kickback killdeer kouskous landbook landfast landfolk landmark landwash lavalava likewise lineside lockpick longhead markland matamara mateship notehead overboil overburn overhang overhaul overhold overpass overslip overtake overturn overwalk overwing panshard passover picklock piripiti playdown plowgang poolfish railhead ringdove ringhead rootworm seabird shipmate shipward shipwork shotwork shotstar sideburn sidehill sideline skinhead slipover songbird starshot stopback tailband tailbone tallow takedown takeover ticktick townhome turndown turnover walkover wardship washdown washland weedhook wingover wiselike woodbush woodfish woodworm workbook workhand workhead workship workshop wormroot wormwood