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CONTENTS

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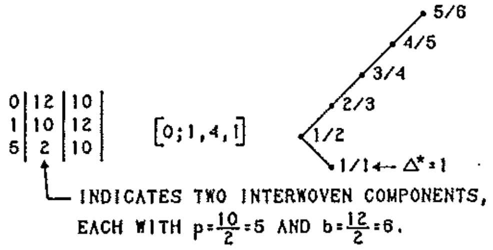
Solutions to the Questions in Issue No. 39

Question on pg. 906.

The knots with $p/b = 10/12$, depicted by the left-hand grid-diagrams in Figs. 717 & 718, consist of two interbraided components, each with $p/b = 5/6$. The path in the RKT for these components is established as shown below:



The general layout of the algorithm diagram for the Regular Cylindrical Braid with $p/b = 10/12$ can now be drawn up with the aid of $\Delta^* = 1$:

$$\begin{array}{ccccccccccccc} \longrightarrow & & & & & & & & & & & & \\ & C & 1 & C & 2 & C & 3 & C & 4 & C & & \\ \vdash & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & & \dashv \\ & C & 4 & C & 3 & C & 2 & C & 1 & C & & \\ & & & & & & & & & & & \longleftarrow \end{array}$$

Thus the algorithm diagram for the foundation knots of the knots depicted by the left-hand grid-diagrams in Figs. 717 & 718 is as follows:

$$\begin{array}{ccccccccccc} \longrightarrow & & & & & & & & & & \\ & & 1 & & 2 & & 3 & & 4 & & \\ \vdash & \cdot & \backslash & \cdot & / & \cdot & \backslash & \cdot & / & \cdot & \dashv \\ & & 4 & & 3 & & 2 & & 1 & & \\ & & & & & & & & & & \longleftarrow \end{array}$$

We can of course also write this algorithm diagram as follows:

$$\begin{array}{ccccccccccc} \longrightarrow & & & & & & & & & & \\ & & 1 & & 2 & & 3 & & 4 & & \\ & & u & & o & & u & & o & & \\ \vdash & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \dashv \\ & & o & & u & & o & & u & & \\ & & 4 & & 3 & & 2 & & 1 & & \\ & & & & & & & & & & \longleftarrow \end{array}$$

From these algorithm diagrams we read the following half-cycle braiding algorithms for the foundation knot:

half-cycle 1		:	$L \longrightarrow R$	Free Run.
half-cycle 2	$i = 0$	:	$L \longleftarrow R$	Free Run.
half-cycle 3	$i = 0$	:	$L \longrightarrow R$	Free Run.
half-cycle 4	$i \leq 1$	:	$L \longleftarrow R$	u .
half-cycle 5	$i \leq 1$	:	$L \longrightarrow R$	u .
half-cycle 6	$i \leq 2$	:	$L \longleftarrow R$	$u - o$.
half-cycle 7	$i \leq 2$	:	$L \longrightarrow R$	$u - o$.
half-cycle 8	$i \leq 3$	:	$L \longleftarrow R$	$u - o - u$.
half-cycle 9	$i \leq 3$	:	$L \longrightarrow R$	$u - o - u$.

half-cycle 10	$i \leq 4$	:	$L \longleftarrow R$	$u - o - u - o$.
half-cycle 11	$i \leq 4$	:	$L \longrightarrow R$	$u - o - u - o$.
half-cycle 12	$i \leq 5$	:	$L \longleftarrow R$	$u - o - u - o$.

For the knot depicted by the left-hand grid-diagram in Fig. 717, the algorithm diagram of the interbraided knot is as follows:

$$
\begin{array}{ccccccccccc}
\longrightarrow & & & & & & & & & & \\
 & C & 1 & C & 2 & C & 3 & C & 4 & C & \\
 & u & u & u & u & o & o & u & o & u & \\
\vdash & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \dashv \\
 & u & o & u & o & o & u & u & u & u & \\
 & C & 4 & C & 3 & C & 2 & C & 1 & C & \\
 & & & & & & & & & & \longleftarrow
\end{array}
$$

From this algorithm diagram we read the following half-cycle braiding algorithms for the interbraided knot:

half-cycle 1′		:	$L \longrightarrow R$	$2u - o - 2u$.
half-cycle 2′	$i = 0$	:	$L \longleftarrow R$	$2u - o - 2u$.
half-cycle 3′	$i = 0$	:	$L \longrightarrow R$	$2u - o - 2u$.
half-cycle 4′	$i \leq 1$	:	$L \longleftarrow R$	$3u - o - 2u$.
half-cycle 5′	$i \leq 1$	:	$L \longrightarrow R$	$3u - o - 2u$.
half-cycle 6′	$i \leq 2$	:	$L \longleftarrow R$	$4u - o - 2u$.
half-cycle 7′	$i \leq 2$	:	$L \longrightarrow R$	$4u - o - 2u$.
half-cycle 8′	$i \leq 3$	:	$L \longleftarrow R$	$4u - 2o - 2u$.
half-cycle 9′	$i \leq 3$	:	$L \longrightarrow R$	$4u - 2o - 2u$.
half-cycle 10′	$i \leq 4$	:	$L \longleftarrow R$	$4u - 2o - u - o - u$.
half-cycle 11′	$i \leq 4$	:	$L \longrightarrow R$	$4u - 2o - u - o - u$.
half-cycle 12′	$i \leq 5$	:	$L \longleftarrow R$	$4u - 2o - u - o - u$.

For the knot depicted by the left-hand grid-diagram in Fig. 718, the algorithm diagram of the interbraided knot is as follows:

$$
\begin{array}{ccccccccccc}
\longrightarrow & & & & & & & & & & \\
 & C & 1 & C & 2 & C & 3 & C & 4 & C & \\
 & u & o & u & u & o & o & u & u & u & \\
\vdash & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \dashv \\
 & u & u & u & o & o & u & u & o & u & \\
 & C & 4 & C & 3 & C & 2 & C & 1 & C & \\
 & & & & & & & & & & \longleftarrow
\end{array}
$$

From this algorithm diagram we read the following half-cycle braiding algorithms for the interbraided knot:

half-cycle 1′		:	$L \longrightarrow R$	$2u - o - 2u$.
half-cycle 2′	$i = 0$	:	$L \longleftarrow R$	$2u - o - 2u$.
half-cycle 3′	$i = 0$	:	$L \longrightarrow R$	$2u - o - 2u$.
half-cycle 4′	$i \leq 1$	:	$L \longleftarrow R$	$u - o - u - o - 2u$.
half-cycle 5′	$i \leq 1$	:	$L \longrightarrow R$	$u - o - u - o - 2u$.
half-cycle 6′	$i \leq 2$	:	$L \longleftarrow R$	$u - o - 2u - o - 2u$.
half-cycle 7′	$i \leq 2$	:	$L \longrightarrow R$	$u - o - 2u - o - 2u$.
half-cycle 8′	$i \leq 3$	:	$L \longleftarrow R$	$u - o - 2u - 2o - 2u$.
half-cycle 9′	$i \leq 3$	:	$L \longrightarrow R$	$u - o - 2u - 2o - 2u$.
half-cycle 10′	$i \leq 4$	:	$L \longleftarrow R$	$u - o - 2u - 2o - 3u$.

half-cycle 11′	$i \leq 4$	:	$L \longrightarrow R$	$u - o - 2u - 2o - 3u$.
half-cycle 12′	$i \leq 5$	:	$L \longleftarrow R$	$u - o - 2u - 2o - 3u$.

Question on pg. 926.

$A = 5$; $l_i = 2$; $r_i = 1$ for the braiding of the reconverted nontrue Flores Knot component of the nontrue Flores Knot component which runs between left bight-boundary 2 and right bight-boundary 1 in Fig. 729. Its six sub-components are braided in the sequence shown.

The generalised algorithm diagram of this reconverted component is as follows:

```
 ⟶     l_i−1   A−l_i   l_i−1   A−1    A−1    A−1    r_i−1   A−r_i
 ⊢                *       *      *      *      *
 /       \       /        \      /      \      /       \        /
 *                        *      *      *      *                ⊣
l_i−1  A−l_i   l_i−1    A−1    A−1    A−1    r_i−1   A−r_i     ⟵
```

The algorithm diagram for the reconverted component associated with the final stage is thus:

```
⟶  1  3  1  4  4  4  0   4
⊢     *  *  *  *  *
/  \  /  \  /  \  /  \   /
*        *  *  *  *      ⊣
1  3  1  4  4  4  0  4  ⟵
```

For the sub-components 1 , 2 , 3 the algorithm diagram is:

```
⟶  1  3  1  4  4  4  0   4
⊢        D     C
/  \  /  \  /  \  /  \   /
         C     D         ⊣
1  3  1  4  4  4  0  4  ⟵
```

Hence for sub-component 1 the algorithm diagram is:

```
⟶  1  3  1  4  4  4  0   4
⊢
/  \  /  \  /  \  /  \   /
                         ⊣
1  3  1  4  4  4  0  4  ⟵
```

From this algorithm diagram we read the following half-cycle braiding algorithms for this sub-component:

half-cycle 1		:	$L_2 \longleftarrow R$	$8o - 4u - 4o - u - 3o - u$.
half-cycle 2	$i = 0$	:	$L_2 \longrightarrow R$	$u - 3o - u - 4o - 4u - 8o$.

Hence for sub-component 2 the algorithm diagram is:

```
⟶  1  3  1  4  4  4  0   4
⊢              C
/  \  /  \  /  \  /  \   /
         C               ⊣
1  3  1  4  4  4  0  4  ⟵
```

From this algorithm diagram we read the following half-cycle braiding algorithms for this sub-component:

half-cycle 1		:	$L_2 \longleftarrow R$	$8o - 4u - 5o - u - 3o - u$.
half-cycle 2	$i = 0$	:	$L_2 \longrightarrow R$	$u - 3o - u - 4o - 5u - 8o$.

Hence for sub-component 3 the algorithm diagram is:

```
⟶  1   3   1   4   4   4   0   4
⊢          D       C
/   \   /   \   /   \   /   \   /
            C       D           ⊣
1   3   1   4   4   4   0   4  ⟵
```

From this algorithm diagram we read the following half-cycle braiding algorithms for this sub-component:

half-cycle 1 : $L_2 \longleftarrow R$ $9o - 4u - 5o - u - 3o - u\,.$
half-cycle 2 $i = 0$: $L_2 \longrightarrow R$ $u - 3o - 2u - 4o - 5u - 8o\,.$

For the sub-components 4, 5, 6 the algorithm diagram is:

```
⟶  1   3   1   4   4   4   0   4
⊢      D   G   E   F   C
/   \   /   \   /   \   /   \   /
C           F   E   G   D       ⊣
1   3   1   4   4   4   0   4  ⟵
```

Hence for sub-component 4 the algorithm diagram is:

```
⟶  1   3   1   4   4   4   0   4
⊢      D       E       C
/   \   /   \   /   \   /   \   /
C               E       D       ⊣
1   3   1   4   4   4   0   4  ⟵
```

From this algorithm diagram we read the following half-cycle braiding algorithms for this sub-component:

half-cycle 1 : $L_2 \longleftarrow R$ $4o - u - 4o - 5u - 4o - u - 3o - 2u\,.$
half-cycle 2 $i = 0$: $L_2 \longrightarrow R$ $u - 4o - u - 5o - 4u - 9o\,.$

Hence for sub-component 5 the algorithm diagram is:

```
⟶  1   3   1   4   4   4   0   4
⊢      D       E   F   C
/   \   /   \   /   \   /   \   /
C           F   E       D       ⊣
1   3   1   4   4   4   0   4  ⟵
```

From this algorithm diagram we read the following half-cycle braiding algorithms for this sub-component:

half-cycle 1 : $L_2 \longleftarrow R$ $4o - u - 4o - 5u - 5o - u - 3o - 2u\,.$
half-cycle 2 $i = 0$: $L_2 \longrightarrow R$ $u - 4o - u - 5o - 5u - 9o\,.$

Hence for sub-component 6 the algorithm diagram is:

```
⟶  1   3   1   4   4   4   0   4
⊢      D   G   E   F   C
/   \   /   \   /   \   /   \   /
C           F   E   G   D       ⊣
1   3   1   4   4   4   0   4  ⟵
```

From this algorithm diagram we read the following half-cycle braiding algorithms for this sub-component:

half-cycle 1 : $L_2 \longleftarrow R$ $4o - u - 5o - 5u - 5o - u - 3o - 2u\,.$
half-cycle 2 $i = 0$: $L_2 \longrightarrow R$ $u - 4o - 2u - 5o - 5u - 9o\,.$

The Flores Knots

The Flores Knots we discussed in the previous issue (No. 39) of *The Braider* were derived from Standard and Semi-Standard Herringbone Pineapple Knots, and consequently were really multi-string knots. In the same way we can derive Flores Knots from Perfect and Semi-Perfect Herringbone Pineapple Knots. If the Perfect or Semi-Perfect Herringbone Pineapple Knot has P_P-parts (where $P_P = 2A + x_P - 2$), then the Flores Knot which evolves from it has P_F-parts (where $P_F = 2P_P - x_P = 2A + x_F - 4$) and requires g.c.d.$(P_F, B^*)$ essential strings. Note that $x_F = x_P + 2A$, hence x_F and A are of different parity. For the same x_P-value, and hence the same P_P-value since $P_P = 2A + x_P - 2$, there are two Perfect or two Semi-Perfect Herringbone Pineapple Knots whose first-return string-runs are the mirror-image of each other.†

Let's first have a look at the case where A is equal to two.

The left-hand grid-diagram in Fig. 730 depicts a Perfect Herringbone Pineapple Knot (hence only one essential string is required) with $A = 2$, $x = 9$, $y = A - 1 = 1$, $B^* = 6$, hence with $P_P = 2 \times 2 + 9 - 2 = 11$. The right-hand grid-diagram in Fig. 730 shows how the Flores Knot is derived from it while retaining the physical appearance of the Perfect Herringbone Pineapple Knot. In this right-hand grid-diagram there are crossings in the second and penultimate crossing-columns which do not yet have a superimposed coding. The codings of those crossings do not affect the physical appearance of the knot. Although each of those crossings can therefore be given an arbitrary coding, we limit these codings so that:

1. The **columns** to which they belong become **column-coded**.
2. The **rows** to which they belong become **semi row-coded**.

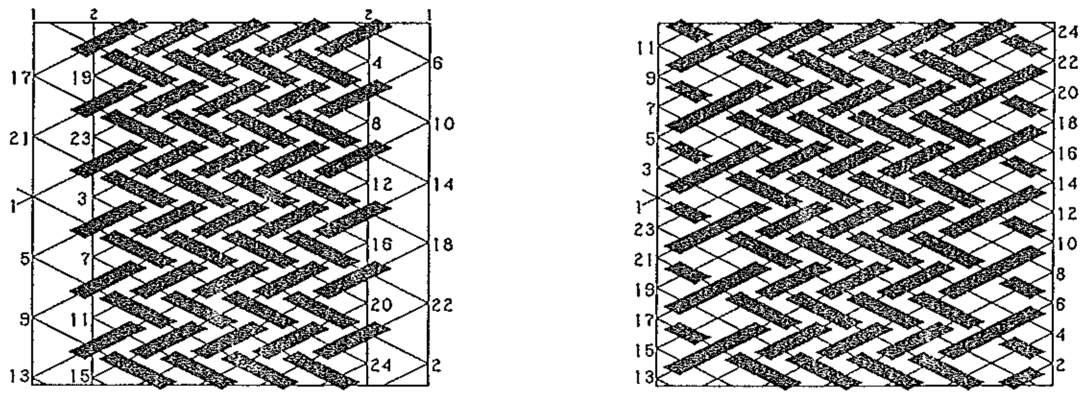


Fig. 730 — The derivation of the Flores Knot from the Perfect Herringbone Pineapple Knot.

When we fulfil the column-coding option (option **1.** above), then the Flores Knot is depicted by the left-hand grid-diagram in Fig. 731.

When we fulfil the semi row-coding option (option **2.** above), then the Flores Knot is depicted by the right-hand grid-diagram in Fig. 731.

⋆⋆ *Draw for each of the grid-diagrams in Fig. 731 the path in the RKT and from it determine their Δ^* values, then construct their algorithm diagrams. Read from their algorithm diagrams their half-cycle braiding algorithms.*

† Refer to *The Braider*, Issue No. 24, pp. 554-562, and Issue No. 28, pp. 644-645.

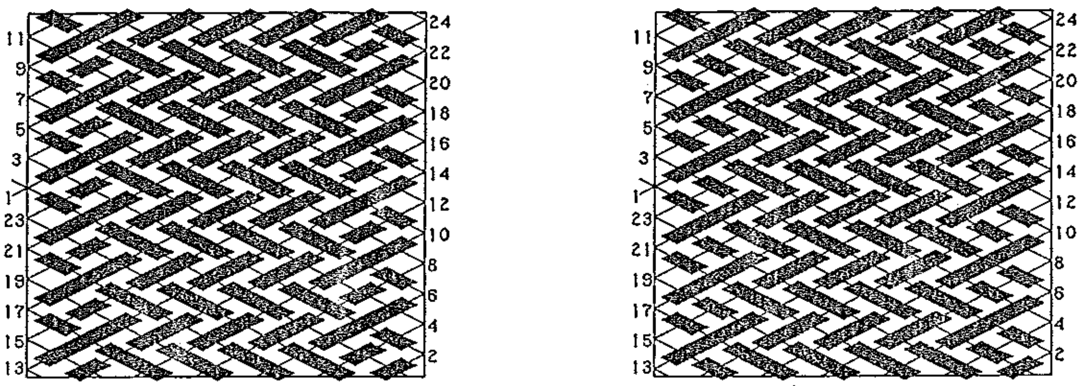


Fig. 731 — The Column-coding and semi Row-coding options.

The left-hand grid-diagram in Fig. 732 depicts a Perfect Herringbone Pineapple Knot (hence only one essential string is required) which is the mirror-image complement of the Perfect Herringbone Pineapple Knot in Fig. 730, hence with $A = 2$, $x = 9$, $y = A + 1 = 3$, $B^* = 6$. The right-hand grid-diagram in Fig. 732 shows how the Flores Knot is derived from it.

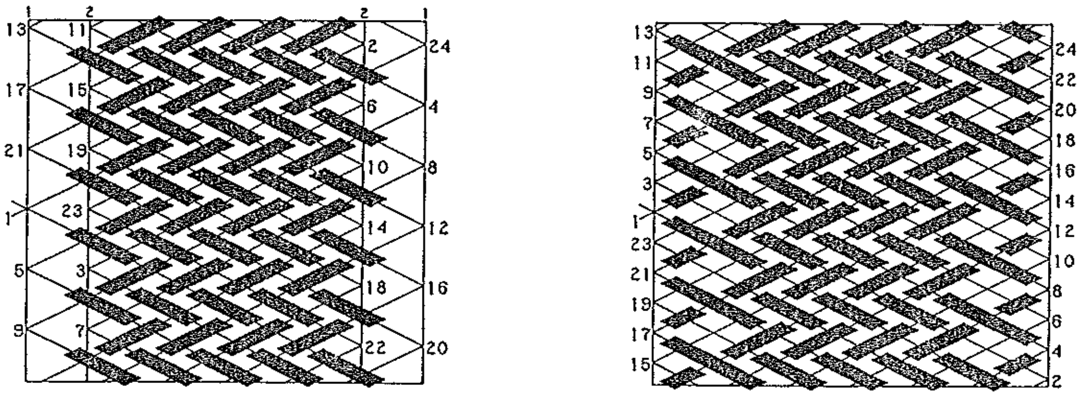


Fig. 732 — The derivation of the Flores Knot from the Perfect Herringbone Pineapple Knot.

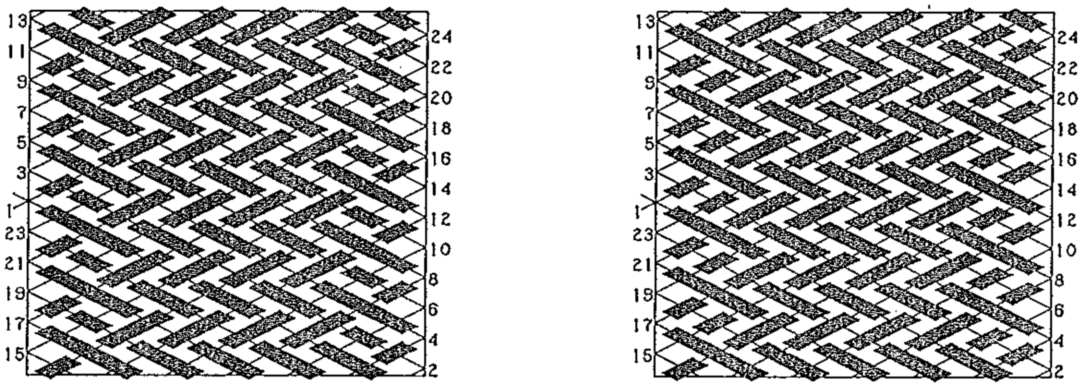


Fig. 733 — The Column-coding and semi Row-coding options.

When we fulfil the column-coding option (option **1.** above), then the Flores Knot is depicted by the left-hand grid-diagram in Fig. 733.

When we fulfil the semi row-coding option (option **2.** above), then the Flores Knot is depicted by the right-hand grid-diagram in Fig. 733.

⋆⋆ *Draw for each of the grid-diagrams in Fig. 733 the path in the RKT and from it determine their Δ^* values, then construct their algorithm diagrams. Read from their algorithm diagrams their half-cycle braiding algorithms.*

Since it is much simpler to determine the half-cycle braiding algorithms for a Regular Knot than for a Perfect or Semi-Perfect Herringbone Pineapple Knot, and since the physical appearance of a Perfect Herringbone Pineapple Knot, or Semi-Perfect Herringbone Pineapple Knot in which all essential strings are identical, is the same as the physical appearance of the Flores Knot derived from it, it is in practice advantageous to replace 2-pass Perfect or Semi-Perfect Herringbone Pineapple Knots which transform into single string Flores Knots (which are then Regular Knots) by those Flores Knots.

⋆⋆ *Draw for each of the Perfect Herringbone Pineapple Knots in Figs. 730 and 732 their first-return string-run, compile their half-cycle pattern and their half-cycle tables.*†

For the case where A is greater than 2, the two types of string-run of the Flores Knots, derived from Perfect or Semi-Perfect Herringbone Pineapple Knots, are two special string-run types of Periodic Regular Nested Cylindrical Braids with sub-nesting-numbers $A_{l_1} = A_{r_1} = A-1$; $A_{l_2} = A_{r_2} = 1$.‡

We use again the conventional start where the first lower-left to upper-right half-cycle starts at left bight-boundary 1. Hence for Flores Knots with $A = even$, which are derived from the Perfect or Semi-Perfect Herringbone Pineapple Knots with $y = A-1$, the first half-cycle from lower-left to upper-right is:

$$1_1 \longrightarrow k-2 \quad \text{when } A = even \text{ and } A \geq \left|\tfrac{x-A-1}{2}\right|_A \geq 3\,.$$
$$1_1 \longrightarrow A-1 \quad \text{when } A = even \text{ and } \left|\tfrac{x-A-1}{2}\right|_A = 1\,.$$
$$1_1 \longrightarrow z_* \quad \text{when } A = even \text{ and } \left|\tfrac{x-A-1}{2}\right|_A = 2\,.$$

In these formulae $k = \left|\frac{x-A-1}{2}\right|_A$; $z = \frac{A}{2}$ while z_* is associated with A_{r_2} .

For Flores Knots with $A = odd$, which are derived from the Perfect or Semi-Perfect Herringbone Pineapple Knots with $y = A-1$, the first half-cycle from lower-left to upper-right is:

$$1_1 \longrightarrow k-2 \quad \text{when } A = odd \text{ and } z+1 \geq \left|\tfrac{x-A-1}{2}\right|_A \geq 3\,.$$
$$1_1 \longrightarrow k-1 \quad \text{when } A = odd \text{ and } A \geq \left|\tfrac{x-A-1}{2}\right|_A > z+1\,.$$
$$1_1 \longrightarrow A \quad \text{when } A = odd \text{ and } \left|\tfrac{x-A-1}{2}\right|_A = 1\,.$$
$$1_1 \longrightarrow z_* \quad \text{when } A = odd \text{ and } \left|\tfrac{x-A-1}{2}\right|_A = 2\,.$$

In these formulae $k = \left|\frac{x-A-1}{2}\right|_A$; $z = \frac{A+1}{2}$ while z_* is associated with A_{r_2} .

For Flores Knots with $A = even$, which are derived from the Perfect or Semi-Perfect Herringbone Pineapple Knots with $y = A+1$, the first half-cycle from lower-left to upper-right is:

$$1_1 \longrightarrow k-2 \quad \text{when } A = even \text{ and } A \geq \left|\tfrac{x-A-3}{2}\right|_A \geq 3\,.$$
$$1_1 \longrightarrow A-1 \quad \text{when } A = even \text{ and } \left|\tfrac{x-A-3}{2}\right|_A = 1\,.$$
$$1_1 \longrightarrow z_* \quad \text{when } A = even \text{ and } \left|\tfrac{x-A-3}{2}\right|_A = 2\,.$$

In these formulae $k = \left|\frac{x-A-3}{2}\right|_A$; $z = \frac{A}{2}$ while z_* is associated with A_{r_2} .

† Refer to *The Braider*, Issue No. 28, pp. 646-656.

‡ Refer to *The Braider*, Issue No. 34, pp. 790-793.

For Flores Knots with $A = odd$, which are derived from the Perfect or Semi-Perfect Herringbone Pineapple Knots with $y = A + 1$, the first half-cycle from lower-left to upper-right is:

$$1_1 \longrightarrow k-2 \quad \text{when } A = odd \text{ and } z+1 \geq \left|\tfrac{x-A-3}{2}\right|_A \geq 3.$$
$$1_1 \longrightarrow k-1 \quad \text{when } A = odd \text{ and } A \geq \left|\tfrac{x-A-3}{2}\right|_A > z+1.$$
$$1_1 \longrightarrow A \quad \text{when } A = odd \text{ and } \left|\tfrac{x-A-3}{2}\right|_A = 1.$$
$$1_1 \longrightarrow z_* \quad \text{when } A = odd \text{ and } \left|\tfrac{x-A-3}{2}\right|_A = 2.$$

In these formulae $k = \left|\frac{x-A-3}{2}\right|_A$; $z = \frac{A+1}{2}$ while z_* is associated with A_{r_2}.

Note that in these formulae it is irrelevant whether we take x_P or x_F for x since $x_F = x_P + 2A$; in the grid-diagram of the Flores Knot we have to use x_F of course.

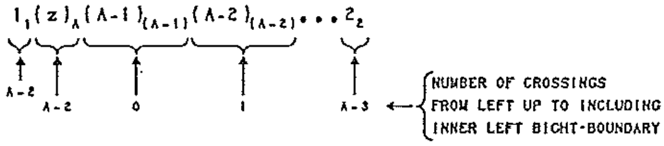
By starting at left bight-boundary 1, we can again for the left bight-edge fully specify in general terms the left bight-boundary sequence specification (the left bight-boundary sequence with their ranking-numbers). For the right bight-edge we can only specify in general terms the cyclic sequence of the bight-boundaries since the first lower-left to upper-right half-cycle can be made to end at anyone of the right bight-boundaries which then receives the ranking-number 1.

The number of crossings on a half-cycle are again calculated as the sum of three sets of crossings:

i). The number of crossings between the left-hand bight-boundary 1 up to and including the innermost left-hand bight-boundary.
ii). The number of crossings between the innermost left-hand bight-boundary and the innermost right-hand bight-boundary; hence equal to $(x-1)$.
iii). The number of crossings between the right-hand bight-boundary 1 up to and including the innermost right-hand bight-boundary.

When we write the number of crossings under **i)** below the bight-boundaries in the left bight-boundary sequence specification, then the general scheme is as follows:

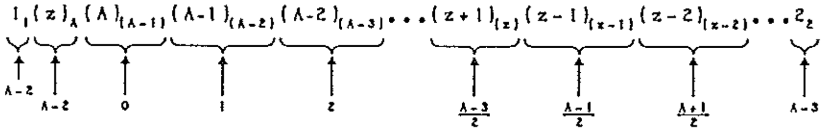
a). The two sub-nesting numbers A_{l_1} and A_{l_2} do have the same parity, hence $A = even$.



b). The two sub-nesting numbers A_{l_1} and A_{l_2} do not have the same parity, hence $A = odd$.

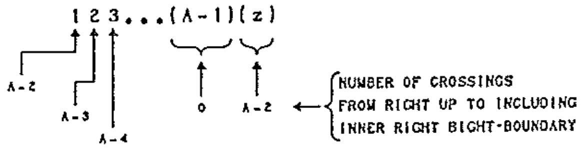
1). For $A_{l_1} = A_{l_2} + 1$, hence for $A = 3$:

2). For $A_{l_1} \geq A_{l_2} + 3$, hence for $A \geq 5$:



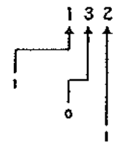
When we write the number of crossings under **iii)** below the bight-boundaries in the right cyclic bight-boundary sequence specification, then the general scheme is as follows:

a). The two sub-nesting numbers A_{r_1} and A_{r_2} do have the same parity, hence $A = even$.

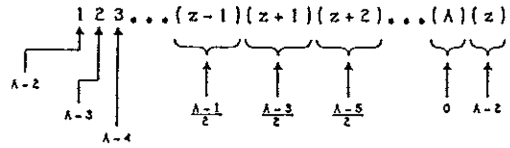


b). The two sub-nesting numbers A_{r_1} and A_{r_2} do not have the same parity, hence $A = odd$.

1). For $A_{r_1} = A_{r_2} + 1$, hence for $A = 3$:



2). For $A_{r_1} \geq A_{r_2} + 3$, hence for $A \geq 5$:



Note that these above schemes are in fact the schemes in *The Braider*, Issue No. 34, pg. 801, for $A_{l_2} = A_{r_2} = 1$.

The calculation procedures for establishing the half-cycle braiding algorithms of a Flores Knot with $A \geq 3$, derived from a Perfect or Semi-Perfect Herringbone Pineapple Knot, follow the procedures as discussed in *The Braider*, Issue No. 34, for the Periodic Regular Nested Cylindrical Braids.

Example 1.:

Let $A = 5$ hence with $A_{l_2} = A_{r_2} = 1$ we obtain $A_{l_1} = A_{r_1} = 4$. Let $x_P = 12$, hence $x_F = 12 + 2A = 22$. Let $B_{total} = 25$, hence $B^* = 5$. Let $y_P = A - 1$.

Since $A = odd$, hence $z = \frac{A+1}{2} = \frac{5+1}{2} = 3$, and $k = \left|\frac{x-A-1}{2}\right|_A = \left|\frac{22-5-1}{2}\right|_5 = 3$. Since $z+1 \geq \left|\frac{x-A-1}{2}\right|_A \geq 3$, the first lower-left to upper-right half-cycle is $1_1 \longrightarrow k-2$, hence $1_1 \longrightarrow 1$.

The left bight-boundary position specification is 2112,

hence $\mathcal{K}_l = 5$.

The left bight-boundary sequence specification is $1_1 3_5 5_4 4_3 2_2$.

The right bight-boundary position specification is 2112,

hence $\mathcal{K}_r = 5$.

The right bight-boundary sequence specification is $1_1 2_2 4_3 5_4 3_5$.

Hence the string-run specification of this Flores Knot is:

$$(2112/22/2112)\{1_1 3_5 5_4 4_3 2_2 / 1_1 2_2 4_3 5_4 3_5\}25.$$

We can now readily calculate the Δ_{l_i} and the Δ_{r_i} values:

$$\begin{array}{llll} \Delta_{l_i} = 6 & \text{for } l_i = 1\,. & \Delta_{r_i} = 6 & \text{for } r_i = 1\,. \\ \Delta_{l_i} = 4 & \text{for } l_i = 2\,. & \Delta_{r_i} = 4 & \text{for } r_i = 2\,. \\ \Delta_{l_i} = 3 & \text{for } l_i = 3\,. & \Delta_{r_i} = 3 & \text{for } r_i = 3\,. \\ \Delta_{l_i} = 2 & \text{for } l_i = 4\,. & \Delta_{r_i} = 2 & \text{for } r_i = 4\,. \\ \Delta_{l_i} = 0 & \text{for } l_i = 5\,. & \Delta_{r_i} = 0 & \text{for } r_i = 5\,. \end{array}$$

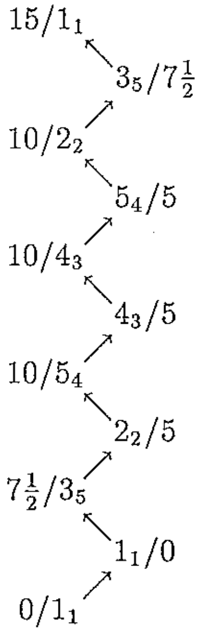
Each lower-left to upper-right half-cycle type in a Nested Cylindrical Braid occurs only once in all the first-return string-runs of such a braid. Hence we can read the lower-left to upper-right half-cycle types from the Flores Knot (Periodic Regular Nested Cylindrical Braid) specification $(2112/22/2112)\{1_1 3_5 5_4 4_3 2_2/1_1 2_2 4_3 5_4 3_5\}25$.

$$\begin{array}{l} 1_1 \longrightarrow 1_1 \\ 3_5 \longrightarrow 2_2 \\ 5_4 \longrightarrow 4_3 \\ 4_3 \longrightarrow 5_4 \\ 2_2 \longrightarrow 3_5 \end{array}$$

Anyone of these listed types may be taken as the first lower-left to upper-right half-cycle in the first-return string-run, but normally we take the first listed one.

Note that a Flores Knot which is derived from a Perfect or Semi-Perfect Herringbone Pineapple Knot has only one first-return string-run since a Perfect or Semi-Perfect Herringbone Pineapple Knot has only one first-return string-run. Hence all the listed lower-left to upper-right half-cycle types of such a Flores knot are contained in the single first-return string-run of that Flores Knot. Consequently such a Flores knot has only one component. This component consists of g.c.d.$(P_F\,, B^*)$ sub-components and hence requires g.c.d.$(P_F\,, B^*)$ essential strings.

For the first-return string-run we thus obtain:



$$\begin{array}{lllll} l_{1_{j_l}} = 1_1 \longrightarrow 1_1 = r_{1_{j_r}} & \rightarrow & j'_l = |1+6+22+6|_5 = 5 & \rightarrow & l_{2_{j'_l}} = 3_5\,. \\ l_{2_{j'_l}} = 3_5 \longleftarrow 1_1 = r_{1_{j_r}} & \rightarrow & j'_r = |1+6+22+3|_5 = 2 & \rightarrow & r_{2_{j'_r}} = 2_2\,. \\ l_{2_{j_l}} = 3_5 \longrightarrow 2_2 = r_{2_{j'_r}} & \rightarrow & j'_l = |5+3+22+4|_5 = 4 & \rightarrow & l_{3_{j'_l}} = 5_4\,. \\ l_{3_{j'_l}} = 5_4 \longleftarrow 2_2 = r_{2_{j_r}} & \rightarrow & j'_r = |2+4+22+0|_5 = 3 & \rightarrow & r_{3_{j'_r}} = 4_3\,. \\ l_{3_{j_l}} = 5_4 \longrightarrow 4_3 = r_{3_{j'_r}} & \rightarrow & j'_l = |4+0+22+2|_5 = 3 & \rightarrow & l_{4_{j'_l}} = 4_3\,. \\ l_{4_{j'_l}} = 4_3 \longleftarrow 4_3 = r_{3_{j_r}} & \rightarrow & j'_r = |3+2+22+2|_5 = 4 & \rightarrow & r_{4_{j'_r}} = 5_4\,. \\ l_{4_{j_l}} = 4_3 \longrightarrow 5_4 = r_{4_{j'_r}} & \rightarrow & j'_l = |3+2+22+0|_5 = 2 & \rightarrow & l_{5_{j'_l}} = 2_2\,. \\ l_{5_{j'_l}} = 2_2 \longleftarrow 5_4 = r_{4_{j_r}} & \rightarrow & j'_r = |4+0+22+4|_5 = 5 & \rightarrow & r_{5_{j'_r}} = 3_5\,. \\ l_{5_{j_l}} = 2_2 \longrightarrow 3_5 = r_{5_{j'_r}} & \rightarrow & j'_l = |2+4+22+3|_5 = 1 & \rightarrow & l_{6_{j'_l}} = 1_1\,. \\ l_{6_{j'_l}} = 1_1 \longleftarrow 3_5 = r_{5_{j_r}}\,. & & & & \end{array}$$

$$I_{L_1} = 0 \quad ; \quad I_{L_{n+1}} = \left| I_{L_n} + x_F + \Delta r_i + \tfrac{\Delta l_i + \Delta l_{i+1}}{2} \right|_B .$$

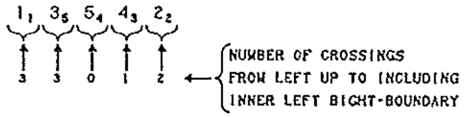
$$I_{R_1} = 0 \quad ; \quad I_{R_{n+1}} = \left| I_{R_n} + x_F + \Delta l_i + \tfrac{\Delta r_i + \Delta r_{i+1}}{2} \right|_B .$$

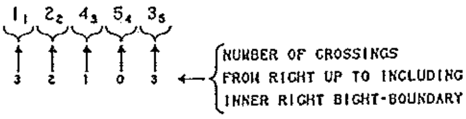
$P_c = P_F = 2A + x_F - 4 = 10 + 22 - 4 = 28$.

g.c.d.$(P_F\,, B^*) =$ g.c.d.$(28\,, 5) = 1$, hence the component has no sub-components, consequently this Flores Knot requires one essential string (it is a single string knot).

This single string Flores Knot was derived from the Semi-Perfect Herringbone Pineapple Knot with $A = 5$; $x_P = 12$; $y = A - 1$; $B^* = 5$; $P_P = 20$, having g.c.d.$(P_P, B^*) =$ g.c.d.$(20, 5) = 5$, consequently this Semi-Perfect Herringbone Pineapple Knot requires five essential strings (it is a five string knot). However, the physical appearance of these two knots is the same.

In the half-cycle pattern arrangement we again indicate the number of crossings associated with a half-cycle under its half-cycle number.† On pp. 934-935 we discussed the calculation procedure of the number of crossings, and from the general schemes shown we obtain for our Example:





Hence the half-cycle pattern arrangement of our Flores Knot will be as shown in Fig. 734.

1	2	3	4	5		5	4	3	2	1
		13/26			— 22½ —			20/27		
31/27	49/26		47/22	45/22	— 20 —	18/23	16/23		14/23	32/27
		43/26			— 17½ —			50/27		
11/27	29/26		27/22	25/22	— 15 —	48/23	46/23		44/23	12/27
		23/26			— 12½ —			30/27		
41/27	9/26		7/22	5/22	— 10 —	28/23	26/23		24/23	42/27
		3/26			— 7½ —			10/27		
21/27	39/26		37/22	35/22	— 5 —	8/23	6/23		4/23	22/27
		33/26			— 2½ —			40/27		
1/27	19/26		17/22	15/22	— 0 —	38/23	36/23		34/23	2/27

Fig. 734 — The half-cycle pattern of the Flores Knot in Example 1.

For the superimposed coding we can follow the semi row-coding arrangement as discussed for $A = 2$ on pp. 931-932, or we can follow its counter part which we shall call the non semi row-coding arrangement.

For the pattern of unders and overs associated with a particular half-cycle type, we can make use of the coding-patterns in:

Fig. 737 for Flores Knots with the semi-row coding arrangement, derived from Perfect or Semi-Perfect Herringbone Pineapple Knots with $y = A - 1$,

Fig. 738 for Flores Knots with the non semi row-coding arrangement, derived from Perfect or Semi-Perfect Herringbone Pineapple Knots with $y = A - 1$,

Fig. 739 for Flores Knots with the semi-row coding arrangement, derived from Perfect or Semi-Perfect Herringbone Pineapple Knots with $y = A + 1$,

Fig. 740 for Flores Knots with the non semi row-coding arrangement, derived from Perfect or Semi-Perfect Herringbone Pineapple Knots with $y = A + 1$.

† See *The Braider*, Issue No. 34, pg. 800.

These Figs. depict on the lower-left to upper-right half-cycles and on the lower-right to upper-left half-cycles the initial and final consecutive sets of over and under codings which do not follow the '*A*-over — *A*-under' pattern.

The initial consecutive sets of coding which end with a set of over-codings is followed by $Au - Ao - \cdots$, and which end with a set of under-codings is followed by $Ao - Au - \cdots$.

The final consecutive sets of coding which begin with a set of over-codings is preceded by $\cdots - Ao - Au$, and which begin with a set of under-codings is preceded by $\cdots - Au - Ao$.

Say that in our example we use the semi row-coding arrangement. Then with the aid of Fig. 737 (case $A = 5$) and the number of crossings on the half-cycles we can in the half-cycle tables for the lower-left to upper-right half-cycles and the lower-right to upper-left half-cycles enter the coding sequences (see Figs. 735 and 736).

X	19	17	15	33	21	39	37	35	3	41	9	7	5	23	11	29	27	25	43	31	49	47	45	13	X	19										
13	X	19	17	15	33	21	39	37	35	3	41	9	7	5	23	11	29	27	25	43	31	49	47	45	13	X										
31	49	47	45	13	X	19	17	15	33	21	39	37	35	3	41	9	7	5	23	11	29	27	25	43	31	49										
43	31	49	47	45	13	X	19	17	15	33	21	39	37	35	3	41	9	7	5	23	11	29	27	25	43	31										
11	29	27	25	43	31	49	47	45	13	X	19	17	15	33	21	39	37	35	3	41	9	7	5	23	11	29										
23	11	29	27	25	43	31	49	47	45	13	X	19	17	15	33	21	39	37	35	3	41	9	7	5	23	11										
41	9	7	5	23	11	29	27	25	43	31	49	47	45	13	X	19	17	15	33	21	39	37	35	3	41	9										
3	41	9	7	5	23	11	29	27	25	43	31	49	47	45	13	X	19	17	15	33	21	39	37	35	3	41										
21	39	37	35	3	41	9	7	5	23	11	29	27	25	43	31	49	47	45	13	X	19	17	15	33	21	39										
33	21	39	37	35	3	41	9	7	5	23	11	29	27	25	43	31	49	47	45	13	X	19	17	15	33	21										
u	u	o	o	o	u	o	o	o	o	o	u	u	u	u	u	o	o	o	o	o	u	o	o	o	u	u	1		21		41		11		31	
u	u	u	o	o	u	u	o	o	o	o	o	u	u	u	u	u	o	o	o	o	o	o	o	o	o	X	19		39		9		29		49	
o	o	o	o	o	o	o	o	o	u	u	u	u	u	o	o	o	o	o	u	u	o	o	u	u	u	X		33		3		23		43		13
u	u	u	u	o	u	u	u	o	o	o	o	o	u	u	u	u	u	u	u	u	u	X	X	X	X	X	17		37		7		27		47	
u	u	u	u	u	u	u	u	u	o	o	o	o	o	u	u	u	o	u	u	u	u	X	X	X	X	X	15		35		5		25		45	

Fig. 735 — The half-cycle table for the lower-left to upper-right half-cycles.

2	34	36	38	40	22	4	6	8	10	42	24	26	28	30	12	44	46	48	50	32	14	16	18	20	2	34										
20	2	34	36	38	40	22	4	6	8	10	42	24	26	28	30	12	44	46	48	50	32	14	16	18	20	2										
32	14	16	18	20	2	34	36	38	40	22	4	6	8	10	42	24	26	28	30	12	44	46	48	50	32	14										
50	32	14	16	18	20	2	34	36	38	40	22	4	6	8	10	42	24	26	28	30	12	44	46	48	50	32										
12	44	46	48	50	32	14	16	18	20	2	34	36	38	40	22	4	6	8	10	42	24	26	28	30	12	44										
30	12	44	46	48	50	32	14	16	18	20	2	34	36	38	40	22	4	6	8	10	42	24	26	28	30	12										
42	24	26	28	30	12	44	46	48	50	32	14	16	18	20	2	34	36	38	40	22	4	6	8	10	42	24										
10	42	24	26	28	30	12	44	46	48	50	32	14	16	18	20	2	34	36	38	40	22	4	6	8	10	42										
22	4	6	8	10	42	24	26	28	30	12	44	46	48	50	32	14	16	18	20	2	34	36	38	40	22	4										
40	22	4	6	8	10	42	24	26	28	30	12	44	46	48	50	32	14	16	18	20	2	34	36	38	40	22										
u	o	o	o	o	u	u	o	o	o	o	o	u	u	u	u	u	o	o	o	o	o	u	o	o	o	o	2		22		42		12		32	
o	o	o	o	u	o	o	o	o	o	u	u	u	u	u	o	o	o	o	o	u	u	o	o	o	o	u		40		10		30		50		20
u	u	o	o	o	u	u	u	o	o	o	o	o	u	u	u	u	u	o	u	u	u	u	X	X	X	X	34		4		24		44		14	
u	u	u	o	o	u	u	u	u	o	o	o	o	o	u	u	u	u	o	o	u	u	u	X	X	X	X	36		6		26		46		16	
u	u	u	u	o	u	u	u	u	u	o	o	o	o	o	u	u	u	o	o	o	u	u	X	X	X	X	38		8		28		48		18	

Fig. 736 — The half-cycle table for the lower-right to upper-left half-cycles.

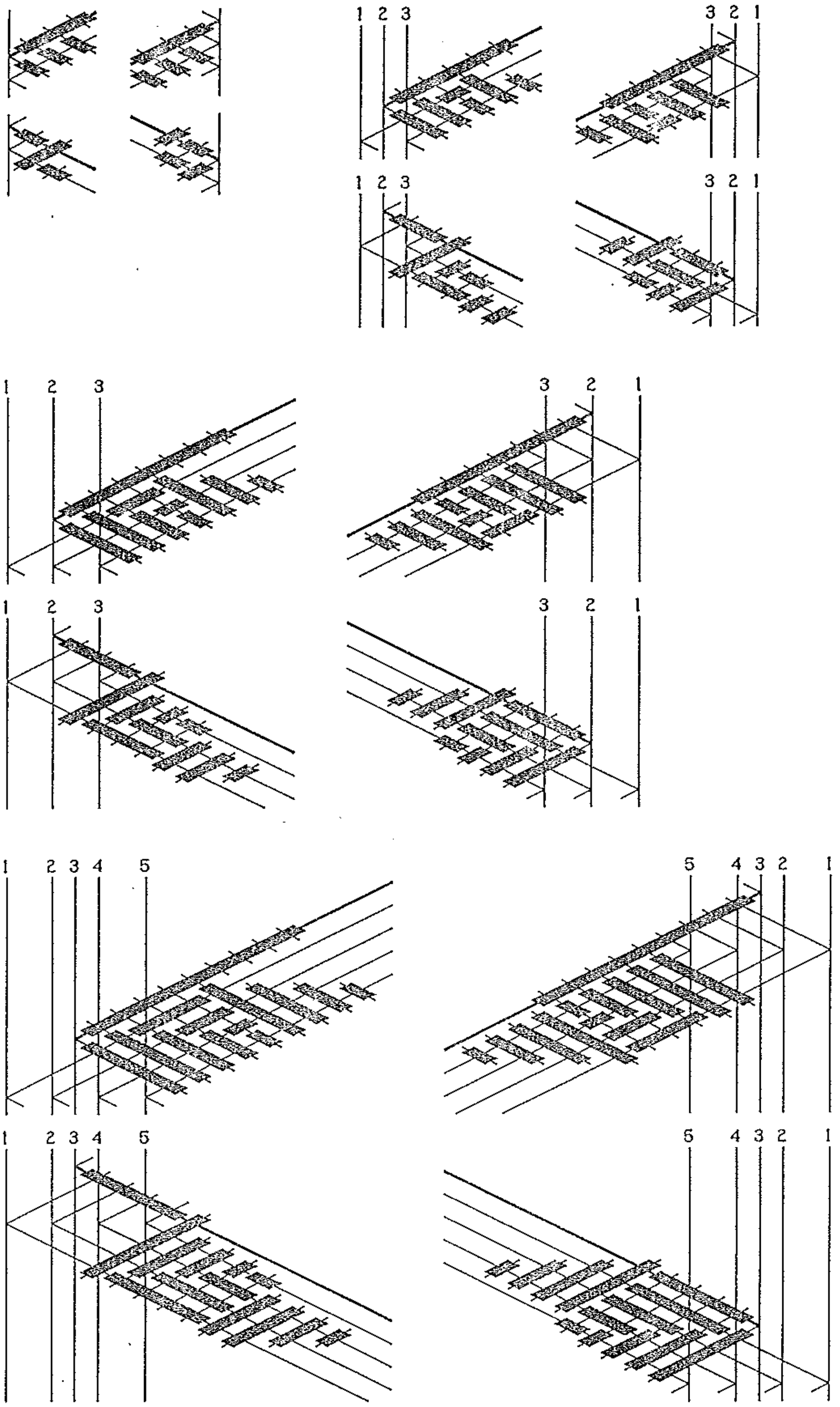


Fig. 737 — The initial and final half-cycle coding sets. (semi row-coding; $y_P = A - 1$).

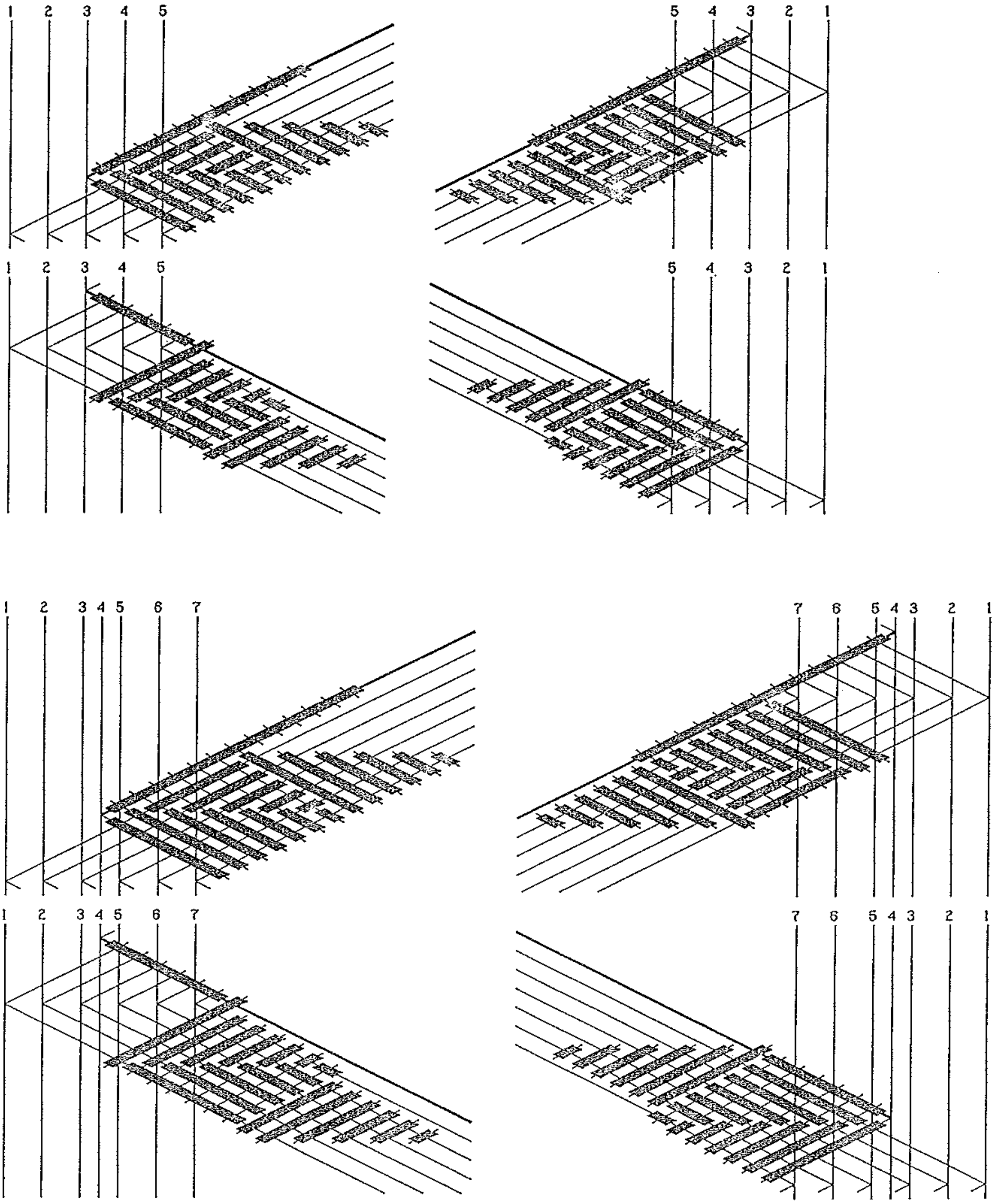


Fig. 737 Cont. — The initial and final half-cycle coding sets. (semi row-coding; $y_P = A - 1$).

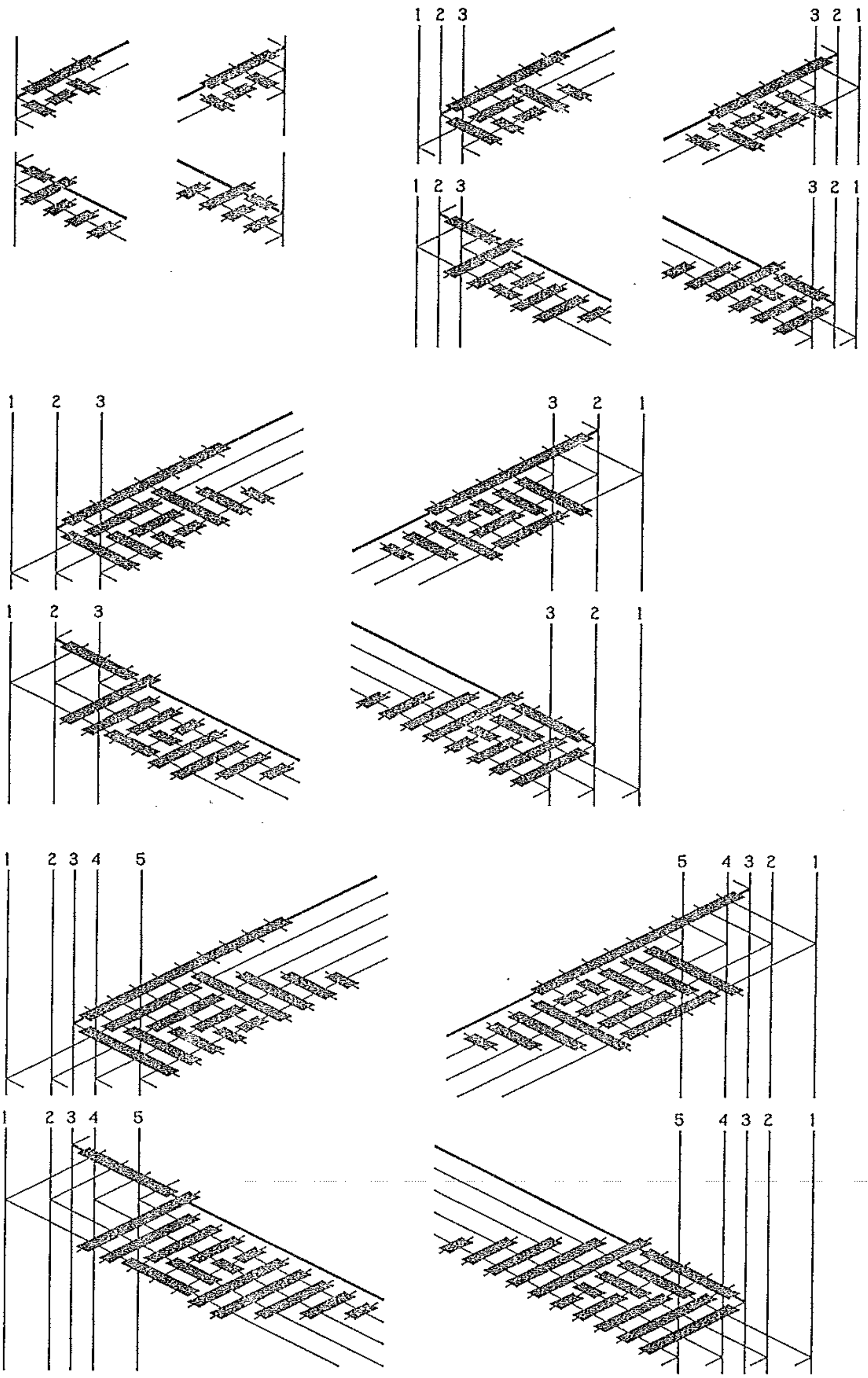


Fig. 738 — The initial and final half-cycle coding sets. (non semi row-coding; $y_P = A - 1$).

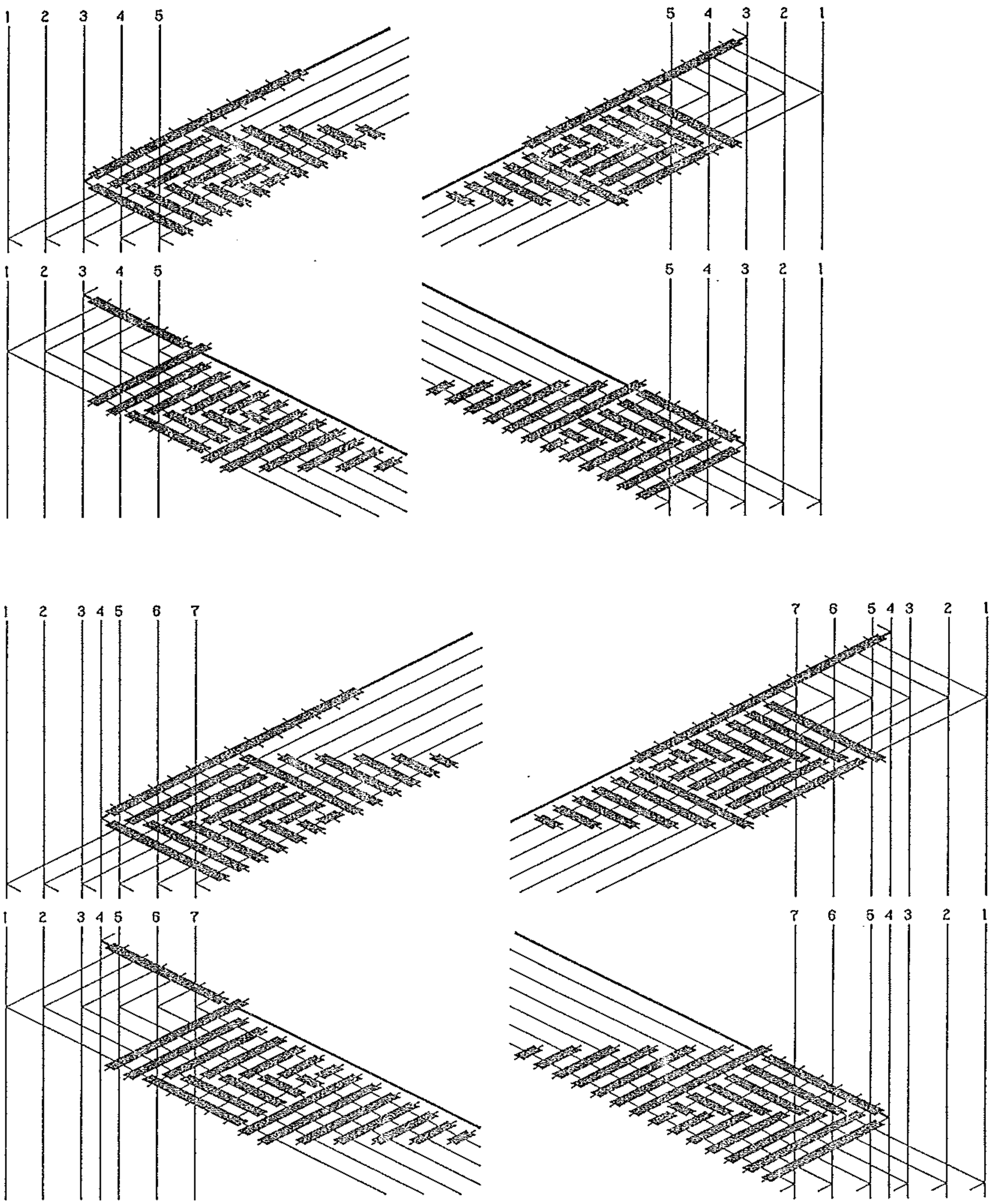


Fig. 738 Cont. — The initial and final half-cycle coding sets. (non semi row-coding; $y_P = A - 1$).

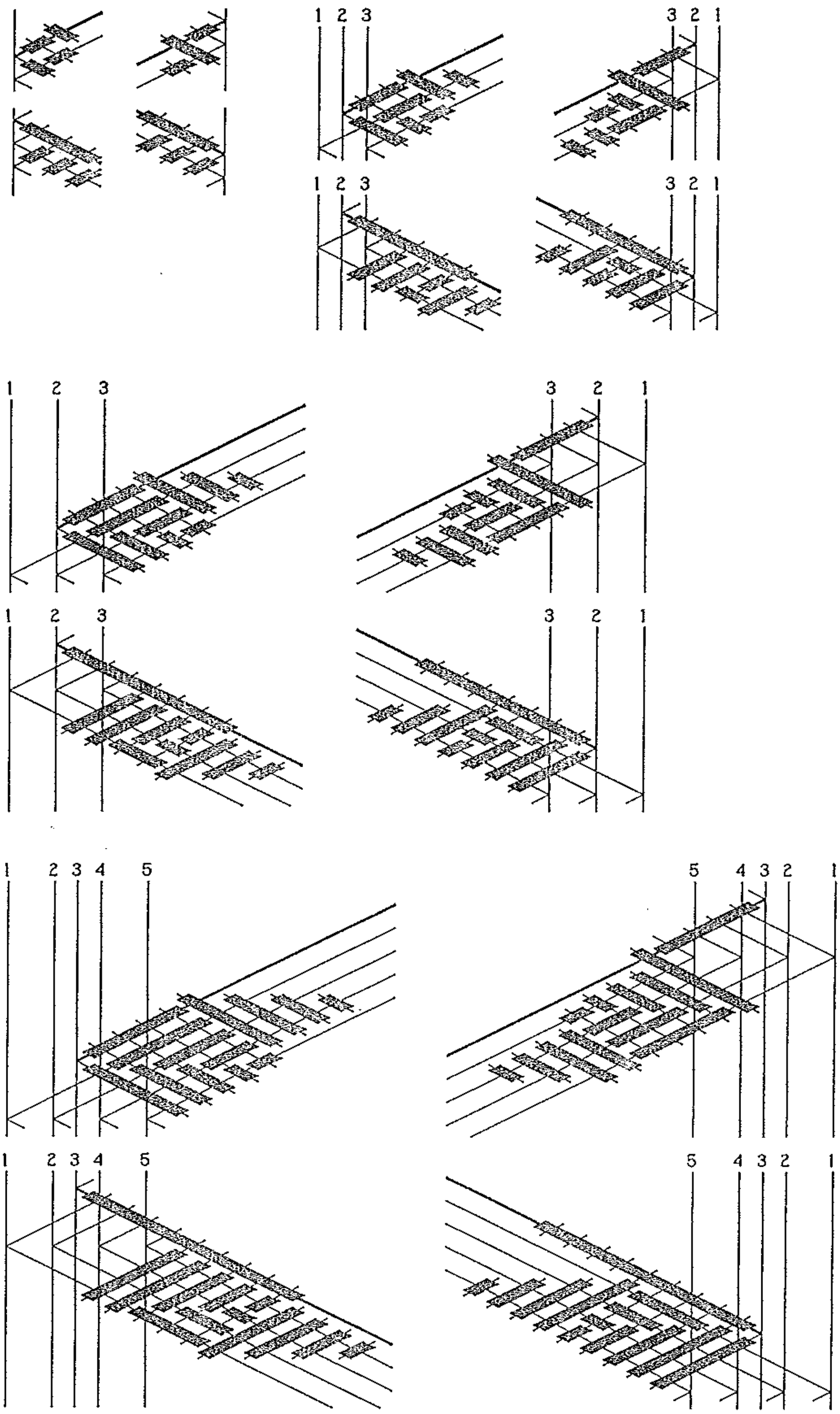


Fig. 739 — The initial and final half-cycle coding sets. (semi row-coding; $y_P = A + 1$).

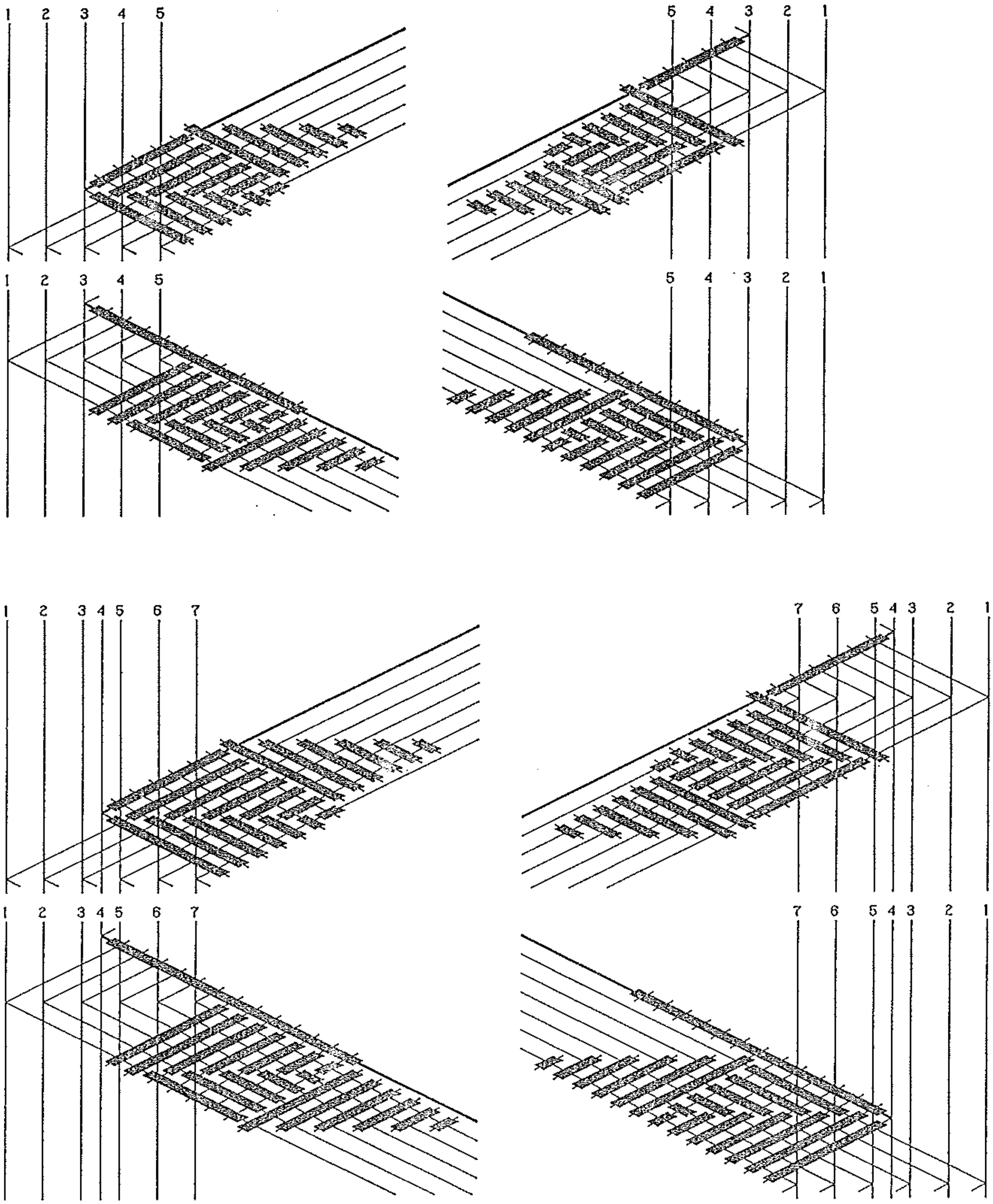


Fig. 739 Cont. — The initial and final half-cycle coding sets. (semi row-coding; $y_P = A + 1$).

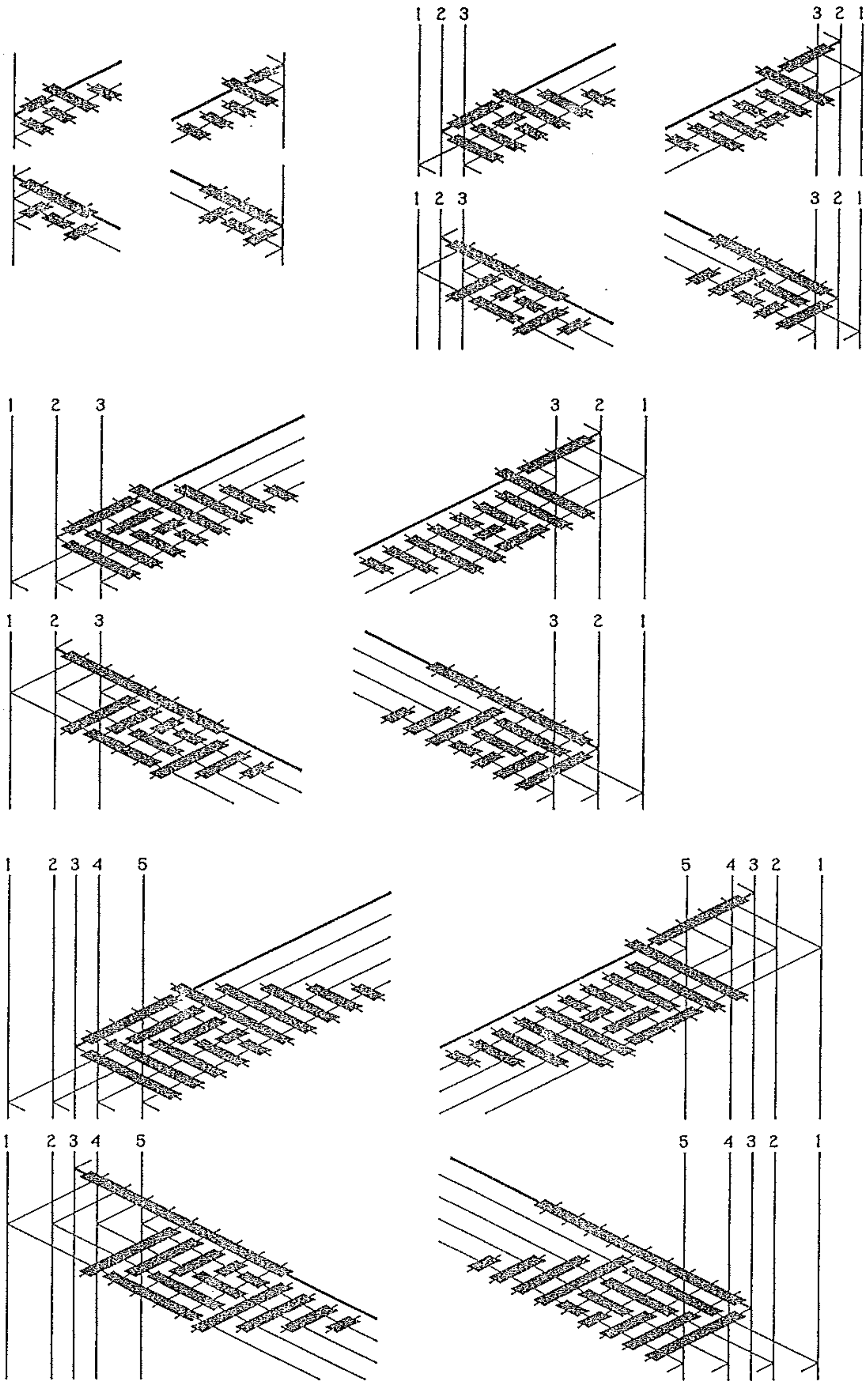


Fig. 740 — The initial and final half-cycle coding sets. (non semi row-coding; $y_P = A + 1$).

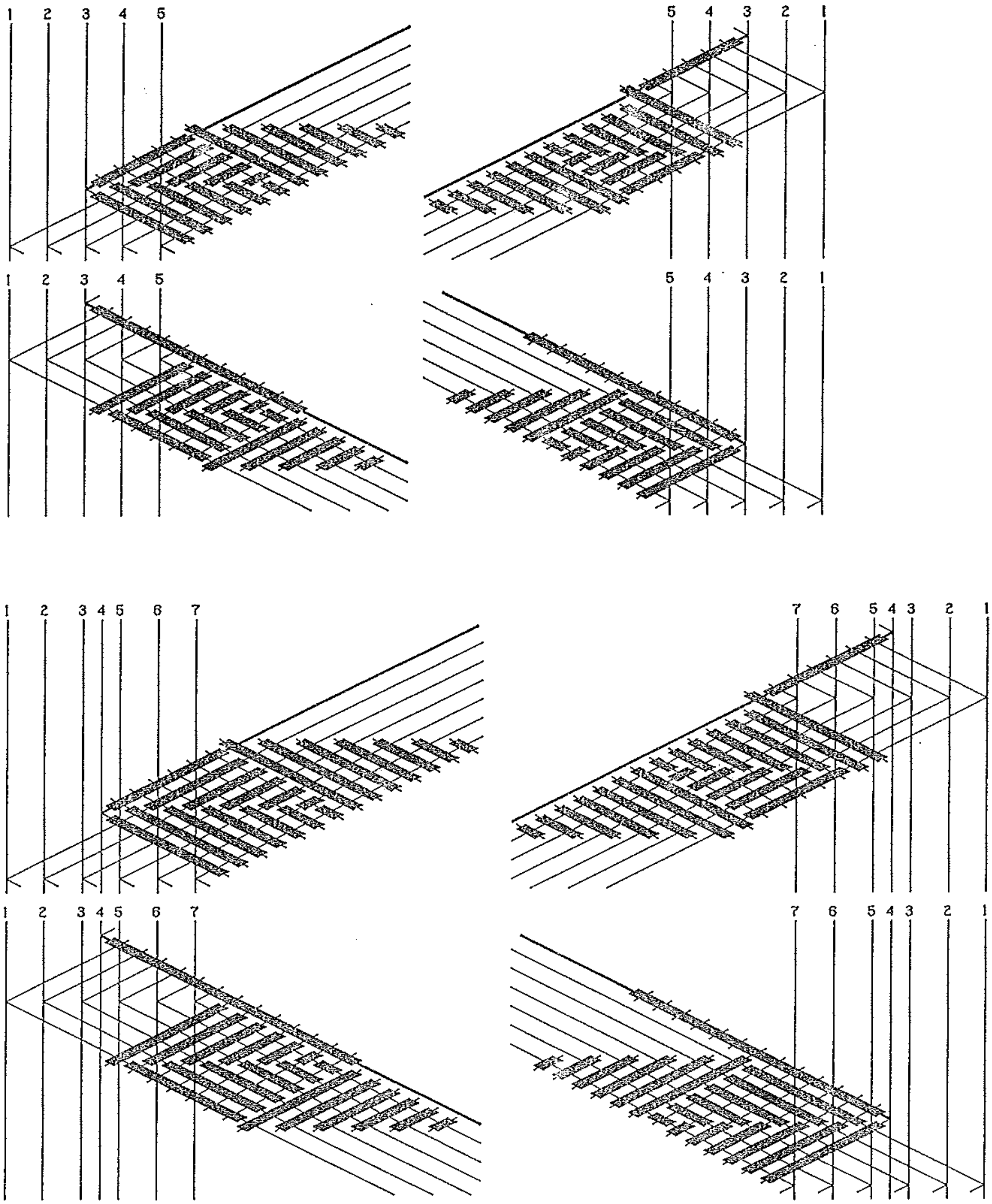


Fig. 740 Cont. — The initial and final half-cycle coding sets. (non semi row-coding; $y_P = A + 1$).

The first-return string-run contains $2A = 10$ half-cycles, hence:
half-cycles $1, 11, 21, 31, 41$ are identically coded, the first-return string-run shows that they start at $l_{i_j} = 1_1$ and end at $r_{i_j} = 1_1$;
half-cycles $3, 31, 23, 33, 43$ are identically coded, the first-return string-run shows that they start at $l_{i_j} = 3_5$ and end at $r_{i_j} = 2_2$;
half-cycles $5, 15, 25, 35, 45$ are identically coded, the first-return string-run shows that they start at $l_{i_j} = 5_4$ and end at $r_{i_j} = 4_3$;
half-cycles $7, 17, 27, 37, 47$ are identically coded, the first-return string-run shows that they start at $l_{i_j} = 4_3$ and end at $r_{i_j} = 5_4$;
half-cycles $9, 19, 29, 39, 49$ are identically coded, the first-return string-run shows that they start at $l_{i_j} = 2_2$ and end at $r_{i_j} = 3_5$;
half-cycles $2, 12, 22, 32, 42$ are identically coded, the first-return string-run shows that they start at $r_{i_j} = 1_1$ and end at $l_{i_j} = 3_5$;
half-cycles $4, 14, 24, 34, 44$ are identically coded, the first-return string-run shows that they start at $r_{i_j} = 2_2$ and end at $l_{i_j} = 5_4$;
half-cycles $6, 16, 26, 36, 46$ are identically coded, the first-return string-run shows that they start at $r_{i_j} = 4_3$ and end at $l_{i_j} = 4_3$;
half-cycles $8, 18, 28, 38, 48$ are identically coded, the first-return string-run shows that they start at $r_{i_j} = 5_4$ and end at $l_{i_j} = 2_2$;
half-cycles $10, 20, 30, 40, 50$ are identically coded. the first-return string-run shows that they start at $r_{i_j} = 3_5$ and end at $l_{i_j} = 1_1$.

From the half-cycle tables we can again read the half-cycle braiding algorithms.

It should be noted that we do not have to draw up the grid-diagram of our Flores Knot, although in general we like to have the grid-diagram of a knot we braid. Hence we can delay drawing the grid-diagram till after we have compiled the half-cycle braiding algorithms from the half-cycle tables:

1. $1_1 \longrightarrow 1_1$: Free run.
2. $3_5 \longleftarrow 1_1$: o.
3. $3_5 \longrightarrow 2_2$: u.
4. $5_4 \longleftarrow 2_2$: $2u$.
5. $5_4 \longrightarrow 4_3$: u.
6. $4_3 \longleftarrow 4_3$: $2u$
7. $4_3 \longrightarrow 5_4$: u.
8. $2_2 \longleftarrow 5_4$: $2u$.
9. $2_2 \longrightarrow 3_5$: $4o$.
10. $1_1 \longleftarrow 3_5$: $o - u - 3o$.
11. $1_1 \longrightarrow 1_1$: $u - 3o - u$.
12. $3_5 \longleftarrow 1_1$: $5u - o$.
13. $3_5 \longrightarrow 2_2$: $4u - o - u$.
14. $5_4 \longleftarrow 2_2$: $2u - 3o - 2u$.
15. $5_4 \longrightarrow 4_3$: $3u - 2o - u$.
16. $4_3 \longleftarrow 4_3$: $3u - 2o - 2u$.
17. $4_3 \longrightarrow 5_4$: $2u - 3o - u$.
18. $2_2 \longleftarrow 5_4$: $4u - o - 2u$.
19. $2_2 \longrightarrow 3_5$: $u - 8o$.
20. $1_1 \longleftarrow 3_5$: $6o - u - 4o$.
21. $1_1 \longrightarrow 1_1$: $u - 4o - u - 3o - 2u$.
22. $3_5 \longleftarrow 1_1$: $7u - o - u - 3o$.

23. $3_5 \longrightarrow 2_2$: $o - 4u - o - u - 2o - 3u$.
24. $5_4 \longleftarrow 2_2$: $2u - 4o - 2u - o - 3u$.
25. $5_4 \longrightarrow 4_3$: $3u - 2o - u - o - 4u$.
26. $4_3 \longleftarrow 4_3$: $3u - 3o - 2u - 2o - 2u$.
27. $4_3 \longrightarrow 5_4$: $2u - 3o - 6u$.
28. $2_2 \longleftarrow 5_4$: $4u - 2o - 2u - 3o - u$.
29. $2_2 \longrightarrow 3_5$: $u - 4o - u - 8o$.
30. $1_1 \longleftarrow 3_5$: $5o - u - 5o - u - 4o$.
31. $1_1 \longrightarrow 1_1$: $u - 5o - 4u - 4o - 2u$.
32. $3_5 \longleftarrow 1_1$: $u - o - u - 4o - 5u - o - u - 4o$.
33. $3_5 \longrightarrow 2_2$: $5o - 5u - o - u - 2o - 3u$.
34. $5_4 \longleftarrow 2_2$: $u - 3o - 2u - 4o - 2u - o - 4u$.
35. $5_4 \longrightarrow 4_3$: $8u - 2o - u - o - 4u$.
36. $4_3 \longleftarrow 4_3$: $2u - 2o - 3u - 3o - 2u - 2o - 3u$.
37. $4_3 \longrightarrow 5_4$: $3u - o - 3u - 3o - 6u$.
38. $2_2 \longleftarrow 5_4$: $3u - o - 4u - 2o - 2u - 3o - 2u$.
39. $2_2 \longrightarrow 3_5$: $2u - 2o - 2u - 4o - u - 9o$.
40. $1_1 \longleftarrow 3_5$: $4o - u - 4o - u - 5o - 2u - 4o - u$.
41. $1_1 \longrightarrow 1_1$: $2u - 5o - 4u - 5o - u - 3o - 2u$.
42. $3_5 \longleftarrow 1_1$: $u - o - u - 5o - 5u - 5o - u - 4o$.
43. $3_5 \longrightarrow 2_2$: $5o - 5u - 5o - 2u - 2o - 3u$.
44. $5_4 \longleftarrow 2_2$: $u - 3o - 3u - 5o - 5u - o - 4u$.
45. $5_4 \longrightarrow 4_3$: $8u - 5o - 3u - o - 4u$.
46. $4_3 \longleftarrow 4_3$: $2u - 2o - 4u - 5o - 4u - 2o - 3u$.
47. $4_3 \longrightarrow 5_4$: $3u - o - 3u - 5o - 9u$.
48. $2_2 \longleftarrow 5_4$: $3u - o - 5u - 5o - 3u - 3o - 2u$.
49. $2_2 \longrightarrow 3_5$: $2u - 2o - 2u - 5o - 5u - 9o$.
50. $1_1 \longleftarrow 3_5$: $4o - u - 5o - 5u - 5o - 2u - 4o - u$.

The grid-diagrams of the Flores Knot and the Semi-Perfect Herringbone Pineapple Knot from which it has been derived are depicted in Fig. 741.

Although for the Flores Knots derived from Perfect or Semi-Perfect Herringbone Pineapple Knots we can calculate the half-cycle bight-boundaries on their first-return string-run by means of the general method for Nested Cylindrical Braids (see *The Braider*, Issue No. 19, pg. 417) as we have done here on pg. 936, it is easier to derive them from the readily to be determined half-cycle bight-boundaries on the first-return string-run of their associated Herringbone Pineapple Knots. The following conversions should then be used:

$A = \text{EVEN}$; $z = \frac{A}{2}$

LEFT BIGHT-BOUNDARY			RIGHT BIGHT-BOUNDARY		
PINE		FLORES	PINE		FLORES
2	►	1_1	2	►	1
1	►	z_A	3	►	2
A	►	$(A-1)_{(A-1)}$	4	►	3
(A-1)	►	$(A-2)_{(A-2)}$	•		•
•		•	•		•
•		•	•		•
•		•	(z-1)	►	(z-2)
(z+1)	►	z_z	z	►	(z-1)
z	►	$(z-1)_{(z-1)}$	(z+1)	►	z
(z-1)	►	$(z-2)_{(z-2)}$	(z+2)	►	(z+1)
•		•	•		•
•		•	•		•
•		•	•		•
4	►	3_3	A	►	(A-1)
3	►	2_2	1	►	z,

$A = \text{ODD}$; $z = \frac{A+1}{2}$

LEFT BIGHT-BOUNDARY			RIGHT BIGHT-BOUNDARY		
PINE		FLORES	PINE		FLORES
2	►	1_1	2	►	1
1	►	z_A	3	►	2
A	►	$A_{(A-1)}$	4	►	3
(A-1)	►	$(A-1)_{(A-2)}$	•		•
•		•	•		•
•		•	•		•
•		•	(z-1)	►	(z-2)
(z+1)	►	$(z+1)_z$	z	►	(z-1)
z	►	$(z-1)_{(z-1)}$	(z+1)	►	(z+1)
(z-1)	►	$(z-2)_{(z-2)}$	(z+2)	►	(z+2)
•		•	•		•
•		•	•		•
•		•	•		•
4	►	3_3	A	►	A
3	►	2_2	1	►	z,

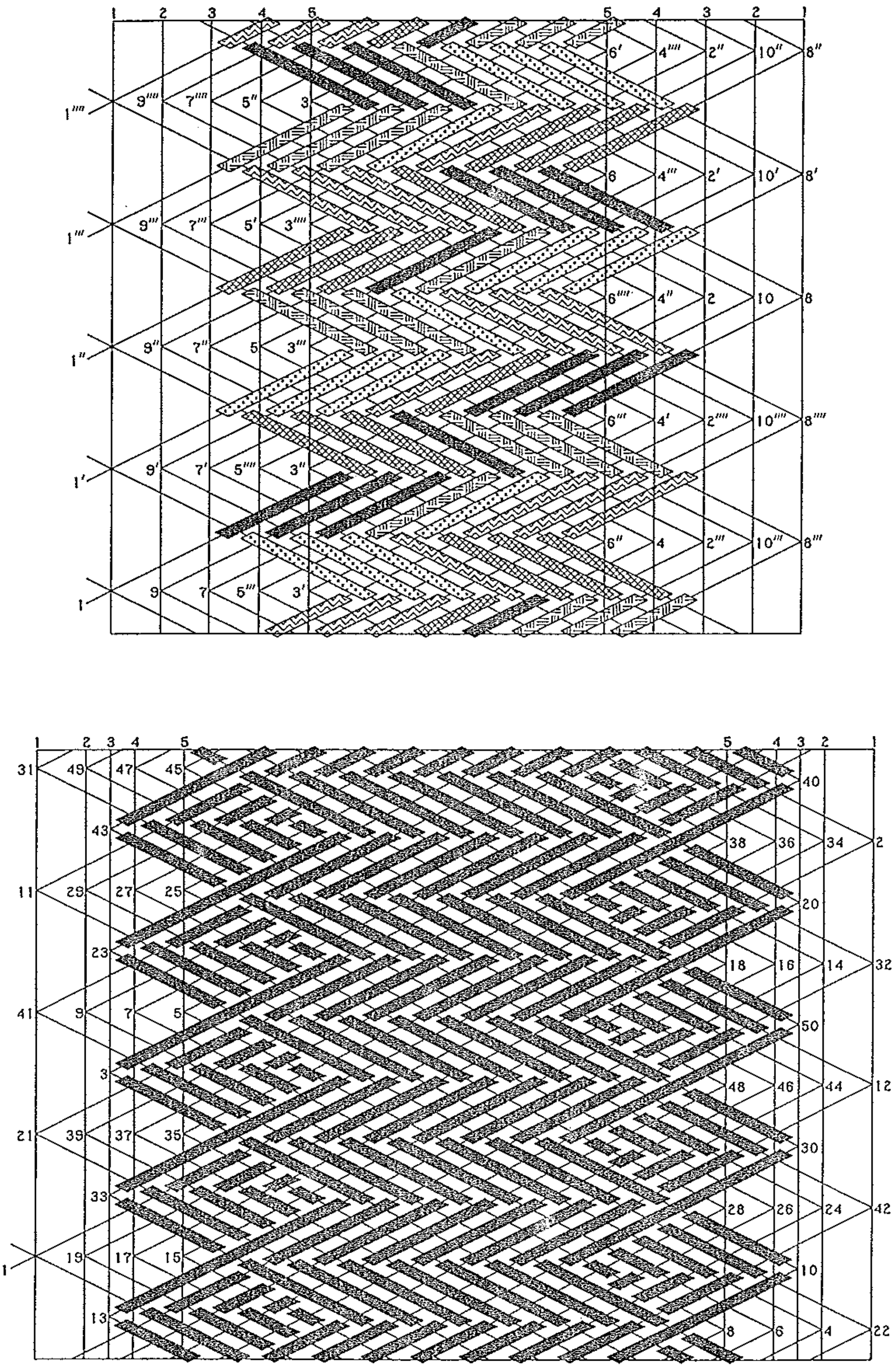


Fig. 741 — The Semi-Perfect Herringbone Pineapple Knot (upper grid-diagram) and Flores Knot derived from it (lower grid-diagram)

Example 2.:

Let $A=6$ hence with $A_{l_2}=A_{r_2}=1$ we obtain $A_{l_1}=A_{r_1}=5$, and let the Flores Knot be derived from the Semi-Perfect Herringbone Pineapple Knot with $y_P=A+1$. Let $x_P=11$, hence $x_F=11+2A=23$. Let $B_{total}=18$, hence $B^*=3$.

Since $A=even$, hence $z=\frac{A}{2}=\frac{6}{2}=3$, and $k=\left|\frac{x-A-3}{2}\right|_A=\left|\frac{23-6-3}{2}\right|_6=1$. Since $\left|\frac{x-A-3}{2}\right|_A=1$, the first lower-left to upper-right half-cycle is $1_1 \longrightarrow A-1=1_1 \longrightarrow 5$.†

The left bight-boundary position specification is 2222, hence $\mathcal{K}_l=5$.

The left bight-boundary sequence specification is $1_1 3_6 5_5 4_4 3_3 2_2$.

The right bight-boundary position specification is 2222, hence $\mathcal{K}_r=5$.

The right bight-boundary sequence specification is $5_1 3_2 1_3 2_4 3_5 4_6$.

Hence the string-run specification of this Flores Knot is:

$$(2222/23/2222)\{1_1 3_6 5_5 4_4 3_3 2_2/5_1 3_2 1_3 2_4 3_5 4_6\}18.$$

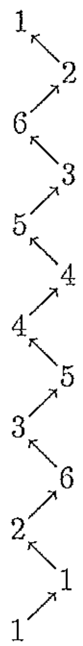
We can now readily calculate the Δ_{l_i} and the Δ_{r_i} values:

$\Delta_{l_i}=8$ for $l_i=1$.	$\Delta_{r_i}=8$ for $r_i=1$.
$\Delta_{l_i}=6$ for $l_i=2$.	$\Delta_{r_i}=6$ for $r_i=2$.
$\Delta_{l_i}=4$ for $l_i=3$.	$\Delta_{r_i}=4$ for $r_i=3$.
$\Delta_{l_i}=2$ for $l_i=4$.	$\Delta_{r_i}=2$ for $r_i=4$.
$\Delta_{l_i}=0$ for $l_i=5$.	$\Delta_{r_i}=0$ for $r_i=5$.

The lower-left to upper-right half-cycle types of the Flores Knot are read from its string-run specification $(2222/23/2222)\{1_1 3_6 5_5 4_4 3_3 2_2/5_1 3_2 1_3 2_4 3_5 4_6\}18$:

$1_1 \longrightarrow 5_1 \quad 3_6 \longrightarrow 3_2 \quad 5_5 \longrightarrow 1_3 \quad 4_4 \longrightarrow 2_4 \quad 3_3 \longrightarrow 3_5 \quad 2_2 \longrightarrow 4_6$

The first-return string-run of the associated Semi-Perfect Herringbone Pineapple Knot (first half-cycle is $1 \longrightarrow 1$ and $\Delta=|A+1|_A=|6+1|_6=1$) is as follows:



† See pg. 933.

By using the conversion table on pg. 948 we obtain for the first-return string-run of the Flores Knot:

$$
\begin{array}{ll}
6/1_1 & \\
\nwarrow & \\
 & 3_2/9 \\
\nearrow & \\
9/3_6 & \\
\nwarrow & \\
 & 1_3/12 \\
\nearrow & \\
12/5_5 & \\
\nwarrow & \\
 & 2_4/0 \\
\nearrow & \\
0/4_4 & \\
\nwarrow & \\
 & 3_5/6 \\
\nearrow & \\
6/3_3 & \\
\nwarrow & \\
 & 4_6/12 \\
\nearrow & \\
12/2_2 & \\
\nwarrow & \\
 & 5_1/0 \\
\nearrow & \\
0/1_1 &
\end{array}
$$

The nest-index numbers are again calculated with the following formulae:

$$I_{L_1} = 0 \quad ; \qquad I_{L_{n+1}} = \left| I_{L_n} + x_F + \Delta r_i + \tfrac{\Delta l_i + \Delta l_{i+1}}{2} \right|_B .$$

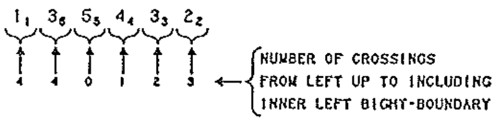
$$I_{R_1} = 0 \quad ; \qquad I_{R_{n+1}} = \left| I_{R_n} + x_F + \Delta l_i + \tfrac{\Delta r_i + \Delta r_{i+1}}{2} \right|_B .$$

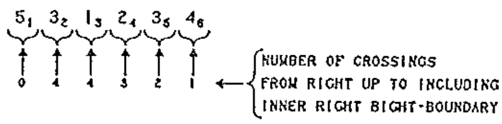
$P_c = P_F = 2A + x_F - 4 = 12 + 23 - 4 = 31$.

g.c.d. (P_F , B^*) = g.c.d. $(31 , 3) = 1$, hence the component has no sub-components, consequently this Flores Knot requires one essential string (it is a single string knot).

This single string Flores Knot was derived from the Semi-Perfect Herringbone Pineapple Knot with $A = 6$; $x_P = 11$; $y = A + 1$; $B^* = 3$; $P_P = 21$, having g.c.d. (P_P , B^*) = g.c.d. $(21 , 3) = 3$, consequently this Semi-Perfect Herringbone Pineapple Knot requires three essential strings (it is a three string knot). However, the physical appearance of these two knots is the same.

In the half-cycle pattern arrangement we again indicate the number of crossings associated with a half-cycle under its half-cycle number.† On pp. 934-935 we discussed the calculation procedure of the number of crossings, and from the general schemes shown we obtain for our Example:





Hence the half-cycle pattern arrangement of our Flores Knot will be as shown in Fig. 742.

† See *The Braider*, Issue No. 34, pg. 800.

1	2	3	4	5		5	4	3	2	1
		23/30			— 15 —			24/30		
25/26	3/26	17/26	31/26	9/26	— 12 —	26/25	4/25	18/25	32/25	10/30
		11/30			— 9 —			12/30		
13/26	27/26	5/26	19/26	33/26	— 6 —	14/25	28/25	6/25	20/25	34/30
		35/30			— 3 —			36/30		
1/26	15/26	29/26	7/26	21/26	— 0 —	2/25	16/25	30/25	8/25	22/30

Fig. 742 — The half-cycle pattern of the Flores Knot in Example 2.

Say that we use the non semi row-coding arrangement. Then with the aid of Fig. 740 Cont. (case $A = 6$) and the number of crossings on the half-cycles we can in the half-cycle tables for the lower-left to upper-right half-cycles and the lower-right to upper-left half-cycles enter the coding sequences (see Figs. 743 and 744).

23	X	15	29	7	21	35	13	27	5	19	33	11	25	3	17	31	9	23	X	15	29	7	21	35	13	27	5	19	33						
25	3	17	31	9	23	X	15	29	7	21	35	13	27	5	19	33	11	25	3	17	31	9	23	X	15	29	7	21	35						
11	25	3	17	31	9	23	X	15	29	7	21	35	13	27	5	19	33	11	25	3	17	31	9	23	X	15	29	7	21						
13	27	5	19	33	11	25	3	17	31	9	23	X	15	29	7	21	35	13	27	5	19	33	11	25	3	17	31	9	23						
35	13	27	5	19	33	11	25	3	17	31	9	23	X	15	29	7	21	35	13	27	5	19	33	11	25	3	17	31	9						
X	15	29	7	21	35	13	27	5	19	33	11	25	3	17	31	9	23	X	15	29	7	21	35	13	27	5	19	33	11						
o	o	o	o	o	u	o	o	o	o	o	o	u	u	u	u	u	u	o	o	o	o	o	o	u	o	o	o	o	o	23		35		11	
u	u	o	o	o	o	u	u	o	o	o	o	o	o	u	u	u	u	u	u	u	u	u	u	u	u	X	X	X	X		1		13		25
u	u	u	o	o	o	u	u	u	o	o	o	o	o	o	u	u	u	u	u	o	u	u	u	u	u	X	X	X	X		15		27		3
u	u	u	u	o	o	u	u	u	u	o	o	o	o	o	o	u	u	u	u	o	o	u	u	u	u	X	X	X	X		29		5		17
u	u	u	u	u	o	u	u	u	u	u	o	o	o	o	o	o	u	u	u	o	o	o	u	u	u	X	X	X	X		7		19		31
u	u	u	u	u	u	u	u	u	u	u	u	o	o	o	o	o	o	u	u	o	o	o	o	u	u	X	X	X	X		21		33		9

Fig. 743 — The half-cycle table for the lower-left to upper-right half-cycles.

24	22	8	30	16	2	36	34	20	6	28	14	12	10	32	18	4	26	24	22	8	30	16	2	36	34	20	6	28	14						
10	32	18	4	26	24	22	8	30	16	2	36	34	20	6	28	14	12	10	32	18	4	26	24	22	8	30	16	2	36						
12	10	32	18	4	26	24	22	8	30	16	2	36	34	20	6	28	14	12	10	32	18	4	26	24	22	8	30	16	2						
34	20	6	28	14	12	10	32	18	4	26	24	22	8	30	16	2	36	34	20	6	28	14	12	10	32	18	4	26	24						
36	34	20	6	28	14	12	10	32	18	4	26	24	22	8	30	16	2	36	34	20	6	28	14	12	10	32	18	4	26						
22	8	30	16	2	36	34	20	6	28	14	12	10	32	18	4	26	24	22	8	30	16	2	36	34	20	6	28	14	12						
o	o	o	o	o	o	o	o	o	o	o	u	u	u	u	u	u	o	o	o	o	o	o	u	o	o	o	o	o	u	24		36		12	
u	o	o	o	o	o	u	o	o	o	o	o	o	u	u	u	u	u	u	o	o	o	o	o	o	o	o	o	o	o		22		34		10
u	u	o	o	o	o	u	u	o	o	o	o	o	o	u	u	u	u	u	o	u	u	u	u	u	X	X	X	X	X		8		20		32
u	u	u	o	o	o	u	u	u	o	o	o	o	o	o	u	u	u	u	o	o	u	u	u	u	X	X	X	X	X		30		6		18
u	u	u	u	o	o	u	u	u	u	o	o	o	o	o	o	u	u	u	o	o	o	u	u	u	X	X	X	X	X		16		28		4
u	u	u	u	u	o	u	u	u	u	u	o	o	o	o	o	o	u	u	o	o	o	o	u	u	X	X	X	X	X		2		14		26

Fig. 744 — The half-cycle table for the lower-right to upper-left half-cycles.

The grid-diagrams of the Flores Knot and the Semi-Perfect Herringbone Pineapple Knot from which it has been derived are depicted in Fig. 745.

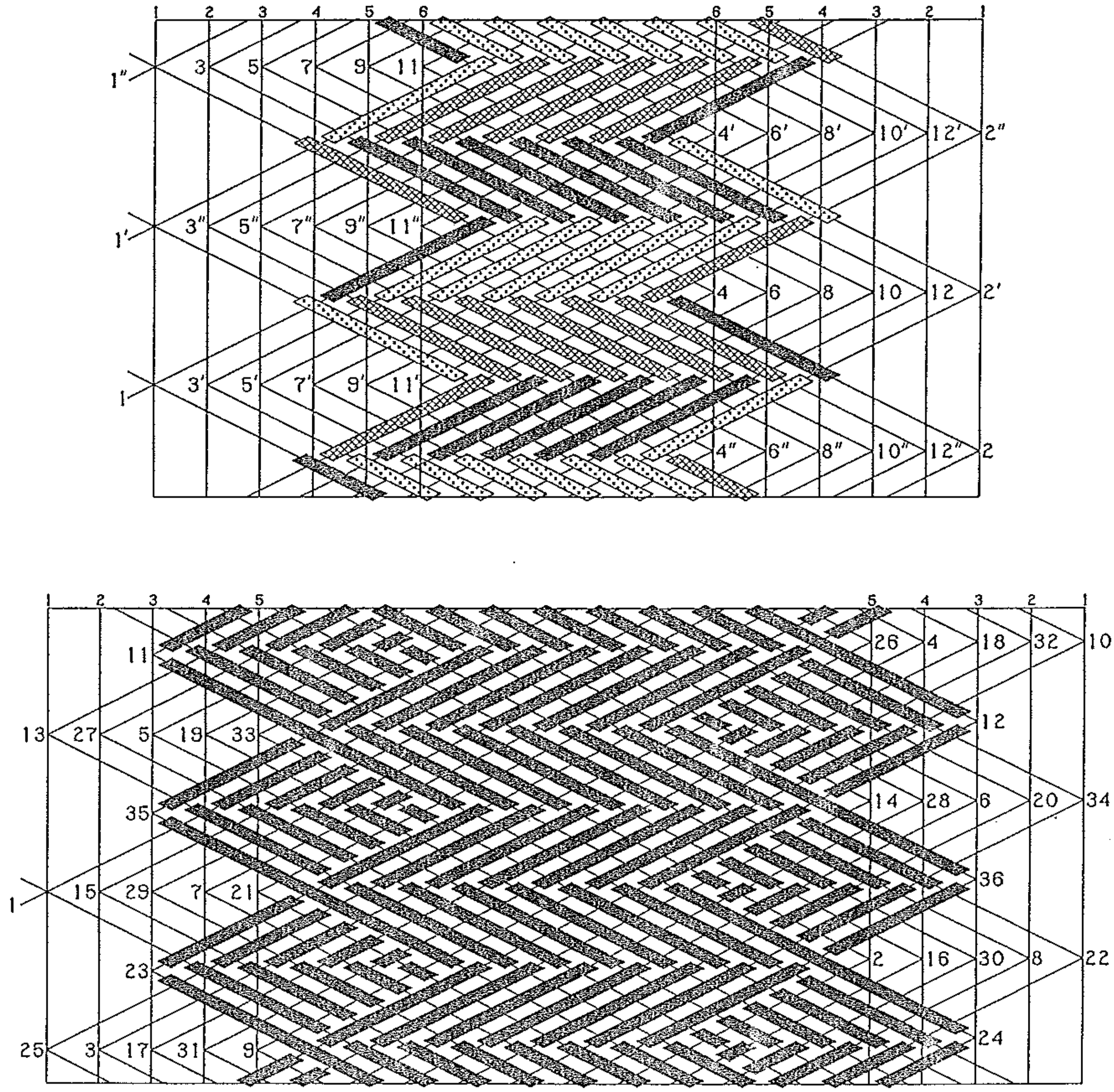


Fig. 745 — The Semi-Perfect Herringbone Pineapple Knot (upper grid-diagram) and Flores Knot derived from it (lower grid-diagram)

From the half-cycle tables (Figs. 743 and 744) we read the following half-cycle braiding algorithms:

1. $1_1 \longrightarrow 5_1$: Free run.
2. $2_2 \longleftarrow 5_1$: u.
3. $2_2 \longrightarrow 4_6$: o.
4. $3_3 \longleftarrow 4_6$: $o - 2u$.
5. $3_3 \longrightarrow 3_5$: $u - 2o$.
6. $4_4 \longleftarrow 3_5$: $2o - 2u$
7. $4_4 \longrightarrow 2_4$: $2u - 2o$.

8. $5_5 \longleftarrow 2_4$: $2o - 3u$.
9. $5_5 \longrightarrow 1_3$: $2u - 3o$.
10. $3_6 \longleftarrow 1_3$: $3o - 2u - 3o$.
11. $3_6 \longrightarrow 3_2$: $3o - 2u - 3o$.
12. $1_1 \longleftarrow 3_2$: $4o - u - 5o$.
13. $1_1 \longrightarrow 5_1$: $u - 4o - 4u$.
14. $2_2 \longleftarrow 5_1$: $4u - 2o - 2u - 2o$.
15. $2_2 \longrightarrow 4_6$: $u - o - 2u - 2o - 4u$.
16. $3_3 \longleftarrow 4_6$: $u - o - 2u - 2o - 2u - o - 2u$.
17. $3_3 \longrightarrow 3_5$: $u - o - 2u - 3o - u - o - 2u$.
18. $4_4 \longleftarrow 3_5$: $u - 6o - 2u - o - 2u$.
19. $4_4 \longrightarrow 2_4$: $3u - o - 2u - 3o - u - 2o - u$.
20. $5_5 \longleftarrow 2_4$: $2u - 5o - 4u - o - 2u$.
21. $5_5 \longrightarrow 1_3$: $7u - 3o - u - 2o - u$.
22. $3_6 \longleftarrow 1_3$: $3o - u - 3o - 4u - 7o$.
23. $3_6 \longrightarrow 3_2$: $7o - 4u - 3o - u - 3o$.
24. $1_1 \longleftarrow 3_2$: $7o - 4u - 8o - u$.
25. $1_1 \longrightarrow 5_1$: $u - 3o - u - 4o - 8u$.
26. $2_2 \longleftarrow 5_1$: $4u - o - 2u - 5o - 2u - 3o - u$.
27. $2_2 \longrightarrow 4_6$: $3u - 2o - 2u - 4o - 4u - o - 3u$.
28. $3_3 \longleftarrow 4_6$: $3u - 2o - 3u - 4o - 3u - 2o - 3u$.
29. $3_3 \longrightarrow 3_5$: $3u - o - 4u - 4o - 3u - 2o - 3u$.
30. $4_4 \longleftarrow 3_5$: $u - 3o - 2u - 6o - 3u - o - 4u$.
31. $4_4 \longrightarrow 2_4$: $4u - o - 4u - 5o - 2u - 3o - 2u$.
32. $5_5 \longleftarrow 2_4$: $2u - 10o - 5u - o - 4u$.
33. $5_5 \longrightarrow 1_3$: $11u - 5o - 2u - 4o - u$.
34. $3_6 \longleftarrow 1_3$: $u - 5o - u - 5o - 6u - 11o$.
35. $3_6 \longrightarrow 3_2$: $5o - u - 6o - 5u - 6o - u - 5o$.
36. $1_1 \longleftarrow 3_2$: $11o - 6u - 6o - u - 5o - u$.

⋆⋆ *In practice we would not braid the Flores Knots in Examples 1 and 2 in accordance with the half-cycle braiding algorithms shown since the long string-length required would make the braiding process quite cumbersome. With a long string-length we would, of course, braid a Flores Knot by starting at the centre of the required string-length. How would you handle this and how would you then assemble the necessary half-cycle braiding algorithms? Give for the Examples 1 and 2 the half-cycle braiding algorithms for such a construction method.*

Since a Flores Knot is in appearance identical to a Herringbone Pineapple Knot, only for $A = 2$ does it offer an advantage over the Herringbone Pineapple Knot with respect to the overall calculation procedures which are involved with the derivation of the half-cycle braiding algorithms. For $A > 2$, however, these overall calculation procedures are simpler for the Herringbone Pineapple Knots, hence we would only use a Flores Knot with $A > 2$ when its number of essential strings gives us a desired lay out which is not achievable with a Herringbone Pineapple Knot. For example, if for $A = 5$ with $x = 12$ a single string knot showing a Herringbone Pineapple pattern is desired, then these requirements would be fulfilled for $B^* = 5$ by a Flores knot, while for $B^* = 7$ by a Perfect Herringbone Pineapple Knot.