III. ALL "CANONICAL CELL"
LOCAL ENVIRONMENTS

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corrected May 1990
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Key:

- 3-fold direction ("c") bond
- 2-fold direction ("b") bond
- Point group of environment

\((\beta_y) = (65)_{3322}\text{, count of } (b,c) \text{ bonds and all 5-fold directions with } > 1 \text{ "b" bond around:}\n
2 2' 3 3'
Remarks on choice of a \textit{standard} setting:

My paper says, "put the vertex with maximum $P$ (# of $\text{\textbullet}$ surrounding it) at the center."

However, I considered symmetry equally important so I've included extra pictures where helpful.

There are pairs which have the same \textit{b} arrangement but differ by: $\leftrightarrow$ rearrangement; in some cases this makes a new environment (labeled with ($'$)), in other cases it is related by a symmetry to the old one [that means the \textit{b} bonds had a higher symmetry indicated by [6: 2m] etc.].

Pairs related by $\leftrightarrow$:

\begin{align*}
6, 6 & \quad 6, 6 \\
9, 10 & \quad (64)_{3322} \text{ and (} & 9, 10 & \quad (64)_{3322} \text{ and (} \\
11, 12 & \quad (65)_{3322} & 11, 12 & \quad (65)_{3322} \\
15, 15 & \quad * & 15, 15 & \quad * \\
18, 19 & \quad (66)_{4222} & 18, 19 & \quad (66)_{4222} \\
22, 23 & \quad (66)_{4322} & 22, 23 & \quad (66)_{4322} \\
28, 28 & \quad (75)_{3333} & 28, 28 & \quad (75)_{3333} \\
31, 31 & \quad (75)_{4322} \text{ and (} & 31, 31 & \quad (75)_{4322} \text{ and (} \\
\end{align*}

\* \textit{b}-symmetry

\begin{tabular}{ccc}
6 & $m \rightarrow 2m$ & \textit{Illustrated (addendum)} \\
8 & $3 \rightarrow 3m$ & \\
9, 10 & $m \rightarrow 2m$ & \textit{---} \\
15 & $1 \rightarrow m$ & \textit{---} \\
28 & $m \rightarrow 2m$ & \textit{---} \\
31 & $1 \rightarrow 2$ & \textit{---} \\
\end{tabular}
(67) 3322

(almost 2m) [b: 2m]

(31) (75) 4422

(almost 2m) [b: 2m]
(#9) (64)_{3322}  

\[\text{almost 2m} \cong [b:2m]\]

(#10) (64')_{3322} \text{ dotted}

(#28) (75)_{3333}  

\[\text{almost 2m} \cong [b:2m]\]
1. \((56)_{222}^{m}\)

\((\beta \gamma) = (56)_{222}^{m}\)

2. \((56)_{322}\)

\((\beta \gamma) = (56)_{322}^{m}\)
3. (56)_{4}^{2} \quad \square \quad m

\( (\beta \gamma) = (56)_{4}^{2} \cdot 2' \cdot 2' \)

4. (57)_{3}^{2} \quad 2

\( (\beta \gamma) = (57)_{3}^{2} \cdot 2' \cdot 2' \)
5. \((57)_{332}\)

\[(\beta \gamma) = (57)_{33'2'}\]

6. \((57)_{3322}\)

\[\boxed{m} [b: 2m - see addendum]\]

\[(\beta \gamma) = (57)_{33'2'2'}\]
7.\( (62)_{222222} \)

\( 3m \)

\((\beta \gamma) = (62)_{222222} \)
8. \((6 4)_{2 2 2 2 2 2}\)

\[ [b:3m] \]

\((\beta \gamma) = (64)_{2 2 2 2 2 2}\)
9. \((6.4)_{3322}\)

\[m\]

**symmetrical setting:**

\[b: 2m, \text{see addendum}\]

\((\beta \gamma) = (6.4)_{3322}\)

**Standard setting:**
10. $\left(64\right)_{3322}$

Symmetrical setting

$[b: 2m, \text{see addendum}]$

$\left(\beta \gamma\right) = (64)_{3322}$

Standard setting
11. 

$(65)_{3322}$

$(\beta \gamma) = (65)_{3322}'$

12. 

$(65)'_{3322}$

$(\beta \gamma) = (65)'_{3322}'$
13. \((65)_{432}\)

\((\beta \gamma) = (65)_{432}'\)