$$(B \rho) \longrightarrow B \qquad [\rho\text{-bool}]$$

$$(N\rho) \longrightarrow N \qquad [\rho\text{-num}]$$

$$(CH\rho) \longrightarrow CH \qquad [\rho\text{-char}]$$

$$(O \rho) \longrightarrow O \qquad [\rho\text{-op}]$$

$$((M_1 M_2) \rho) \qquad [\rho\text{-app}]$$

$$\longrightarrow ((M_1 \rho) (M_2 \rho))$$

$$((M :: T) \rho) \longrightarrow ((M \rho) :: T) \qquad [\rho\text{-asc}]$$

$$((\text{mlet } (X T) = M_1 \text{ in } M_2) \rho) \qquad [\rho\text{-let}]$$

$$\longrightarrow (\text{mlet } (X T) = (M_1 \rho) \text{ in } (M_2 \rho))$$

$$(X\rho) \longrightarrow W \qquad [\rho\text{-x}]$$

$$\text{where lookup2} \llbracket \rho, X, W \rrbracket$$

$$(((\lambda (X T) M) \rho) W) \qquad [\text{app}]$$

$$\longrightarrow (\text{subst} \llbracket (X W), M \rrbracket \rho)$$

$$(OB W ...) \longrightarrow W_1 \qquad [\delta B]$$

$$\text{where } \delta B \llbracket (OB W ...), W_1 \rrbracket$$

$$(ON W ...) \longrightarrow W_1 \qquad [\delta N]$$

$$\text{where } \delta N \llbracket (ON W ...), W_1 \rrbracket$$

$$(W :: T) \longrightarrow W \qquad [\text{asc}]$$

$$(\text{mlet } (X T) = W \text{ in } (M \rho)) \qquad [\text{let}]$$

 $\rightarrow (M \operatorname{ext} \llbracket \rho, (XW) \rrbracket)$