





Δῖ ὀϰῖ Δσσῖ· ∇·βσΔ Lβ Δϰῖρδ·Δ·Δ βρ Γῖδὀσῖρῖ ∇ Δἄῖ Γσὀῖ ΔῖἸ·  
∇δ Lβ ∇ ϖῖἸσL·Δδ<ὀ LLῖβ·· ∇·βσ ∇ Δϰῖρἄσσ·Δῖ ∇ἄ·βῖ ἄῖḂ· ∇  
ἄβ·Δῖῖῖ Ἰ<ῖῖ·Δῖ· ∇·βσ Lβ ∇ Δῖ σῖὀὀḂῖ ΔσL ∇β δϰῖ Ḃ·ΔḂῖδσῖ ∇  
Δῖ ΔῖϰLῖῖ Δδ Δσσ·Δῖ Δῖϰ βρ Δϰῖ ϖ·∇ἸὀḂ·· Γῖ ἸδLἄῖρ ἄἄ ΔῖβUῖ  
Δὀ ΔL βΔῖ ΔḂῖ·· βἄϰ βΔῖσβUῖ ὀῖϰ· ∇·βσ Lβ ἄῖḂ· Ḃδ ΔσL  
Ἰ<ῖῖ·Δῖ· ϖῖḂῖ ∇ ∇CLῖ Δϰὀβὀ ὀῖϰ Ḃδ Ἰ<ῖῖ·Δῖ ἄῖḂ· β Δ·ϰσ·Δῖ·  
∇CLὀ Γ·βḂῖρῖ ∇ Δ·ϰσ·Δῖ ∇·βσL βΔῖβUῖ· ἄῖḂ· Δὀσ ὀῖU· Lῖῖ Δὀσ  
·Δἄ ἄῖḂῖἸδῖῖ Δὀῖῖβἄ· ἄḂ· Lβ ΔῖḂ ἄCLὀ Ἰ<ῖῖ·Δῖ ∇ ∇ϰδῖ β  
ΔϰῖḂῖ ἄῖḂῖὀ ΔḂῖῖβἄ ΔḂῖῖβσ<·βὀὀὀ Δἄ Δἄ ἄῖḂῖἸδῖῖ βρ  
ὀϰῖ· ἄḂ· ϖ Δϰ·Δῖ Δσσ·Δῖ ὀῖU ΔUῖ ἄβVΔὀ βΔῖ ἄὀ·∇ἄ·· βΔῖ  
·Δῖῖ·Δῖ· βῖβLἸὀ ὀῖU β<ϰΔὀ ΔUῖ ἄβVΔὀ·· ϖ Δϰ·Δῖ Δσσ·Δῖ ὀῖU  
·ἄῖḂ· βρ ϰδῖὀ·Δδ<ὀ σῖϰῖ· βρ ἄἄḂῖ Δὀϰ· βρ ἄσ·βΔῖῖ ϖῖ ΓῖἸ·β·  
βρ ἄσ·βΔῖῖ totem pole β Δ·ϰσ·Δῖ ∇ ἄῖḂῖἸδῖῖἄσσ·Δῖ· ∇·βσρ βρ  
βῖρϰῖ ϖῖ Δῖϰῖ Δ·ϰσ·Δῖ <·βὀὀὀ ῖḂὀ β ΔῖβUῖ· Δὀϰ Ḃδ Δ·Δἄῖῖ  
·Δἄἄ Δ·Δἄῖῖ ΔḂ·Δἄ Ḃδ ∇ Δῖ Δῖϰῖ·· ϖ βῖρϰ·Δῖ Lβ ϖῖ Δῖϰῖ ὀῖϰ  
·Δἄ·Δῖ ΔσΔ ὀῖϰ Lβ Δ·ϰσ·Δῖ ΓῖἸδὀὀ ΔῖḂ· ΓῖἸδὀὀ ϰḂḂ· ΔḂḂḂ β  
ΔḂῖῖῖῖ ὀῖϰ Ḃδ ἄἄḂ" ∇ ἄἄ<Uῖ· ∇·βσ Lβ β ΔῖἸ Δῖϰῖ  
<·βὀὀσσῖ· ∇·βσ ἄἄ ∇ Δ·Uῖ· ἄῖḂ· β Δσῖῖῖῖῖ Δσσ·Δῖ· Δσρ  
Δσσ·Δῖ βρ Δῖϰῖ ϖῖρḂἄ· ϖ Δῖϰ·Δῖ <ῖρῖ ΔῖḂ·· <ῖρῖ ϖ Δῖϰ·Δῖ  
ΓῖἸδῖ β ΔἸἄῖ·· ῖβ Lβ ϖ ΔῖἸ ΔUσϰῖῖ ϖῖ Δῖϰῖ ἄἄῖβσσῖ βὀϰῖ  
<ῖρῖἸὀὀ ∇ ΔῖἄḂῖῖ Δ Ḃἄἄἄῖ·Δσ·Δῖ·· ϰ·V Lβ ϖ ΔῖἸ Δἄ·Δῖ Δ  
·Δἄῖβσῖ·Δσ·Δῖ· ἄἄ·Δῖ· ἄḂ· ἄἄ ḂἄḂḂ ἄῖḂῖἸδῖῖ β ΔῖḂῖ ὀῖρḂῖ  
ΔḂ·Δἄ β ΔἸἄῖ ∇ <·βὀὀὀῖ· ἄἄ ἄἄ Δῖ ΔῖἄḂῖ·Δῖ ὀρ Δσσ·Δῖ·  
∇·βσ ∇ Δϰῖρἄσσ·Δῖ· ∇δϰσ Lβ ῖ Δῖ σῖὀὀCLῖ Ἰ<ῖῖ·Δἄ βVCLῖ ἄῖḂ· ∇  
ΔσῖḂῖῖ ὀῖϰ ΔLῖρδ·Δῖ β ΔἸῖ· ἄἄ ἄἄ·Δῖ Δῖ Δἄ·Δῖ ΔΔ ὀ·Δ  
·Δἄῖβἄ· ἄἄὀσ ἄἄῖβἄ Ḃδ ϖ Δϰῖ·Δῖ ΔσΔ Δ·Δἄῖῖ βσ<Δῖῖ βΔῖ  
ϰῖῖῖ β Δϰῖῖ· ἄἄῖῖἄἄ· ∇δϰσ ΔLῖρδ·Δῖ βρ Δῖ ϖῖρσϰῖῖ ϖῖ ΔḂḂḂ  
ῖḂσῖ ῖ ϖῖḂ·· ἄἄῖῖἄἄ ∇ ἄἄ<ϰῖ· ∇δ Lβ ∇ ἄἄῖῖἄἄῖῖ ∇  
ΔῖϰὀἸσῖ· ἄ·Δῖ ὀῖϰ ∇ Δἄἄῖῖ· ∇δ Lβ Δῖῖ Lβ ἄἄὀὀ δϰῖῖ βḂῖρἸσῖ  
ΔῖἸ·βἄἄ Ἰῖ ὀῖϰ Lβ Δσρ β ΔḂῖῖῖῖ ἄἄἄῖῖῖ ḂḂḂḂ σῖῖ·βἄὀ

































ΔC·Δσ· Λd ∇ ΔJ b·dJ·dσ·Δ· Δσ·x ∇ VCLd'·dσ·Δ· 9·b· 9  
·ΔPb'·Δbσ·Δ·x ·∇Γ·ndJ· ∇ <PndL9' τ·C ∇ V' <PndL9' Λd  
▷NCN'·Δ ▷ P·P·dL9·Δ·x ▷NJ·P·J·Δ· ∇ <Cσ·σ·x Δσ·L ∇ Δ'·<σ·σ· ▷  
NJ·P·J·Δ· b Δ'·N ΔJ·d'· ∇Γ·ndJ·x ∇·bσ Lb Γ·σ ·∇' Δ'·N ·Δσ·σ·Δ·  
Δσ·σ·Δ ΔC·b·τ·Δ ΔJ·P·J·Δ· τ·C Lb Δσ·σ· ▷NC·b·τ·Δ· b·C·b·< ∇  
ΛL'·P·x Γ·σ Δσ· Δ'·Λ· P·J·Λ·<σ·x ∇·bσ Λd V·x 9·b· P·Λ· ∇·b·  
Δσ·σ· b·C· 9·b·σ·x ∇·bσ·L P·Λ· b Γ·σ·CP· Δσ·σ·Δ· ∇ Δ·σ·Δ·9'·x τ·C  
Lb Δ'·N' P·Λ· b Γ·σ·CP· ∇ <P·C·Δ'·x τ·C Lb Δσ·P P·Λ· b Γ·σ·CP·  
P' Δ·Δ·J·σ· b·Δ J·Δ'·x J·x b C·Δ·J· ∇ τ·C Lb Δ'·N·b bσ·<Δ'·x ·∇·C· Lb  
Δσ· Δσ·L ∇·N·b·U·x J·e Δ·∇·σ·b· Δσ· Δ·V·x· J·e Δ·∇·σ·b· Δσ· Δ·b·C·Δ·  
P' e·C·Δ·L' Δ'·N·b ∇·Δ σ·<Δ'·x ∇·bσ Λd ∇ΔJ ·ΔP·C·Λ' 9·b·σ· ∇  
<σ·σ·x ∇d Lb ∇Γ·Δ·σ·Δ' Δ'·N·b·x ∇d Lb ∇J' ·Δ·Δσ·b·d·N' Λd ∇<·P·x·  
∇·bσ Δσ· Λd ∇ J·b·U· τ·C Λd ∇ P·σ·b·e·J·9' Λd·x Λ·J· Lb ΔJ·e·b·  
ΛL'·P·Δ·x J·e Lb C·V Γ·∇·x· J·e C·V Γ·∇·x· Δσ·σ·Δ ΛL'·P·Δ· ΔJ·e·b·x  
▷L ∇ J·b·U· ∇ ΛL'·P·dσ·Δ·x Γ·C·Δ 9·b· Δσ·σ·Δ Δσ·σ·Δ ΔC·N'·Δσ· b·P  
<C·P·< ·∇·b· Γ·b· ∇ ΛL'·P· ΔL·P·d·Δ' P·J·σ·e·Δ'·x ∇ <L·J· ▷N·e·P·  
·∇Γ·ndJ·Δ ΔC·b·τ·Δσ·σ·x <L·J· ▷N·e·P· ·∇Γ·ndJ·Δ b·ΔJ b·P·C·σ·x ·∇·b·  
·Δ·e P·J·σ·e·Δ' b·P ΛL'·P· ·Δ·e·Δ· Λd ▷C·C·P·Δσ·Δ·Δ P <C·P·Δ' ·∇·b·  
·<L·J· ΔC' ·Δ·e ·∇Γ·ndJ·x ·Δ·e·Δ· Λd Γ·∇ 9·b·σ· P Γ·σ·N'·Δ'·x  
P·P·dL9·Δσ·σ·x ▷C·d P·P·σ·C·J·Δσ·Δ· τ·C Γ·∇ b·ΔJ e·b·C·P· Δ'·P·σ·x  
·Δ·e·Δ· P Δ'·Δ' Δσ·Γ·σ· P·P·dL9·Δσ·σ·x P·N·Λ ΔJ·e·dσ·σ· Lb·x P·N·Λ  
ΛL'·P·Δ·9·Δ'·x τ·C J·e Δ'·L·e·Cσ·σ· b·C·P· U·Λ· ∇b ∇ ·Δσ·C·P· Δ'·C·x  
σ·d· Lb P ΔC·Δ' b·P ·Δσ·C·P·x b·ΔP· Λd P·Λ· Δσ· b P·J·b·x P ΔC·Δ'  
b·L·P ΛL'·P·x P ΔC·Δ' τ·C b·Γ·σ ΔC·N·P· Δ·∇·σ·b·e·x ·b·x· b·C·P· ∇  
ΛL'·P· Δ'·P·x ∇·bσ·P Lb ▷d ∇b b·Λ·P·σ·C·d· ∇b b·N·C·P·P·x ∇·bσ·P  
N·C·P·L·b·σ·Δ·Δ' ▷x· b·P ·Δ·Δσ·C·P·x b·P ·Δσ·C·P· ∇ΛL'·P· Δ'·P·  
<J·U·b·P·d·Δ'·x σ·d· Lb Γ·C·Δ Δ'·N P·Λ· V·C·b· ΔC·b·σ· Δ'·C ΔJ V·C·b·  
b·x· 9·b·e τ·C Λd b·x· N·C·P·d·Δσ· b·P V' C·V Δ ΔN' P·J·σ·e·Δ'·x  
σ·L·e· b·P Γ·J·e·P· ▷NC·b·τ·Δ ΛL'·P·Δσ·Δ·x ∇·bσ ∇ ΔJ P·P·σ·C·b·x ∇·bσ  
∇ ΔJ P·P·σ·C·b· ▷▷ 9·b·e b Δσ·J·C·L·x Γ·J' Lb P·J·b·Δ·Δ' P b·P·L·Δ' ▷▷







∇·bσ Lb ·∇Γ ΛC∞e·b` <∞- P°P\_∞<L9·Δ³\_x ∇·bσ ·∇Γ ΔP ▷L bΔP` b  
·<<CL` ∇ΛL∩r'x ∇b b PΓC·9C·b` Γ\_∞ <∞"x ∇·bσ bΔ·U' V'x Λd P∞b<°  
P VC·<° <σL ∇ Δ·U'x ∇ΔJ σ'ΓC·∇σC'x C·V Lb UU³\_x C·V ∇·bσ ∇ ΔJ  
<∞·∇³C<·b`x ∇·bσ Lb ΛCL\_x