

## 8f"'N\Ub['Ybh\Ø``h.'8]Y'; fYbnYb'i bX 7\Ub\Wb'XYf'6`c\W\_\W\U]b!HY\\bc`c[]Y°

8f"'G"'H\ca Ug'N\Ub['j YfÒZZYbh`]W\h'Y]b'6i W\'ØVYf 6`cW\_W\U]b!HYW\bc`c[]Y'i bX']\fY'5bk YbXi b[Ybž'XUg'X]Y ; fYbnYb'i bX'DchYbn]U`Y'j cb'6]hWc]b'i bX'9h\YfYi a UbU`mg]Yfh"



EiYYb'A Ufm'I b]j Yfg]hm'c Z'@cbXcbž'@cbXcbž'I b]hYX
?]b[Xca !!8]Y'6`cW\_WXU]b!HYWXbc`c[]Y'\Uhrg]WX']b'XYb'YhnhYb

\*J\fYb'ni 'Y]bYa 'YWXhYb'; UaY'7\Ub[YfYbhk]W\_Y'hž'XYf'b]WXh'bi f

X]Y':]bUbnk Y'h'Ui Za ]gWXhž'gcbXYfb'Ui WX'nU\`fY]WXY'UbXYfY

6fUbWXYb'fYj c`i h]cb]Yfh''9]b'bYi Yg'6i WX'j cb'8f'''G'''H\ca Ug

N\Ub[ž'Dfc[fUaa!7c!8]fY\_hcf'XYg'AGW6`cW\_WXU]b'AUbU[YaYbh
UbX'5dd`]WUh]cb'Ub'XYf'EiYYb'AUfm'I b]j Yfg]hm'c Z'@cbXcbž

VY`Yi WXhYh'X]Y'DchYbn]U`Y'i bX'; fYbnYb'X]YgYf'gdUbbYbXYb

HYWXbc`c[]Y''5a'%('''\*')'&\$\&\)'j YfÔZZYbh']WXhž'hfÀ[h'XUg'KYf\_'XYb

H]hY`' H\Y'DchYbh]U`'UbX'@a]hUh]cbg'c Z'6]hWc]b'UbX'9h\YfYi a.'5
: fUaYk cf\_'hc'5ggYgg'6`cW\_WXU]b'Dfc'YWhg'Zfca'U'6ig]bYgg'UbX
9Wcbca]Wg'DYfgdYWh]j Y''i bX'V]YhYh'Y]bY'i aZUggYbXY'5bU`mgY'XYf

8 Ugʻ6i W. ʻn]Y`h'XUfUi ZʻUVžʻ9]bV`]W\_Yʻ]bʻX]YʻA YW. Ub]ga Ybʻj cb
6]hWc]bʻi bXʻ9h\YfYi aʻni [YVYbži bXʻi bhYfgi W. hžʻk Y`W. Y
5bk YbXi b[Ybʻa]hʻ6`cW\_W. U]bʻYfZc`[fY]W. ʻgY]bʻ\_ObbYbʻi bX
k Y`W.YʻY\YfʻgW.Y]hYfbʻ'8]YgYʻXYhU]``]YfhYʻ6YhfUW. hi b[ʻ\_Ubb
gck c\``ZØfʻ: cfgW.YfʻUʻgʻUi W. ZØfʻ: UW. `Yi hYʻUi gʻXYbʻ6YfY]W.Yb
:]bUbnhYW.bc`c[]Yʻi bXʻk]fhgW. UZh`]W.Yʻ=bbcj Uh]cbʻj cbʻ[fc» Ya
=bhYfYggYʻgY]bʻ'8]Yʻ@YgYf.]bbYbʻXØfZYbʻg]W. `Ui Zʻ]bhYfX]gn]d`]bÀfY
DYfgdY\_h]j YbʻZfYi YbžʻX]YʻU\_UXYa]gW.Yʻ: cfgW.i b[ʻa]hʻdfU\_h]gW.Yf
9fZU\fi b[ʻ]bʻXYfʻ6`cW\_W.U]b!; cj YfbUbWʻj YfV]bXYbʻ'8fʻ'N\Ub[
gYʻVghʻVf]b[h'XUVY]ʻY]bYʻVYY]bXfi W\_YbXYʻ? Uff]YfYʻa]hʻY]bYaʻD\8
j cbʻXYfʻ@cbXcbʻ6i g]bYggʻGW.cc``gck]Yʻi a ZUb[fY]W.Y
9fZU\fi b[YbʻUi gʻXYfʻ[`cVU`Yb`:]bUbn!'i bX
I bhYfbY\a YbgVYfUhi b['a]hʻ'

## 8]Y'6`cW\_WXU]b']a 'NY]hU`hYf'XYf 8][]hU`]g]Yfi b[

K Ugʻa UWX hʻ6`cW\_WX U]bʻgcʻVYgcbXYfg3; fi bXgÀhn`]WXʻ\UbXYʻhʻYg g]WXʻi a ʻY]bYʻXYnYbhfUʻYʻi bXʻj YfhY]ʻhYʻ@YX[Yf!HYWXbc`c[]YžʻX]YʻYg Yfa Ò[`]WX hžʻHfUbgU\_h]cbYbʻg]WXYfii bXʻhfUbgdUfYbh'ni dfchc\_c``]YfYb''8]YgYʻHYWXbc`c[]Yʻbi hnhʻ\_fmdhc[fUZ]gWXY 5`[cf]h\a Ybʻi bXʻj Yf`]b\_hYʻ6`ÒW\_Yžʻi a ʻ♣bhY[f]hÀhʻi bXʻ?cbgYbgʻni [Yk À\f`Y]ghYbʻʻXUgʻVYXYi hYhžʻXUggʻg]YʻXUgʻJ YfhfUi Ybʻnk ]gWXYb XYbʻDUfhY]YbʻghÀf\_hʻi bXʻX]YʻBchk YbX][\_Y]hji cbʻ♣bhYfa YX]ÀfYb cVgcʻYhʻa UWXh''8YfʻGWX`ØggYʻni ʻ]\fYa ʻ9]bZi ggʻʻ]Y[hʻ]bʻXYf:À\][\_Y]hžj YfgWX]YXYbYʻ5bk YbXi b[gVYfY]WXYžj cbʻXYf:]bUbnk Y`hʻV]gʻ\]bʻni fʻ; Ygi bX\Y]hgj Yfgcf[i b[ž'ni j YfVYggYfbž k]YʻCLʻ≈ci fbUʻʻVYgWXfY]Vh″

8]Y 5bk YbXi b[Yb'j cb'6`cW\_W\U]b'g]bX'gW\]Yf'YbX`cg", VYf'XUg Gi dd`m'7\U]b'A UbU[Ya Ybhž'k c'X]Y'<Yf\_i bZh'j cb'DfcXi \_hYb bUW\j YfZc`[h'k YfXYb'\_Ubbž'V]g'\]b'ni f'JYfk YbXi b[']a; Ygi bX\Y]hgk YgYbž'k c'DUh]YbhYbU\_hYb'g]W\Yf'[YgdY]W\Yfhi bX [YhY]`h'k YfXYb'\_ObbYbž'nY][h'X]Y'HYW\bc`c[]Y']\f'DchYbn]U`']b j YfgW\]YXYbghYb'GY\_hcfYb"'5i W\'X]Y'9bYf[]YVfUbW\Y'dfcZ]h]Yfhž ]bXYa 'g]Y'DYYf!hc!DYYf!9bYf[]Y\UbXY`'Yfa O[`]W\hž'i bX

FY[]Yfi b[Yb'Yf\_i bXYb'VYfY]hg'g]WXYfY'K U\`gmghYa Y"'6`cW\_WXU]bk]fX'[Uf'U`g'HfY]VYf'XYf'j]YfhYb']bXi ghf]Y``Yb'FYj c`i h]cbUb[YqY\Yb"

## < YfUi gZcfXYfi b[Yb'i bX'DYfgdY\_h]j Yb

$$\label{eq:hamily} \begin{split} &\text{Hfchn} `X] Yg Yf `Ui Zf Y[ Yb XYb `A O[`]W _Y]h Yb `Vf]b[ h`X] Y `6`c W _W U]b! \\ &\text{HYW} bc`c[ ] Y `Ui W `< Yf Ui g Zc f XYf i b[ Yb `a ]h`g] W "`< c \ Y ? cgh Yb ž X] Y \\ &\text{Ui g} `XYf `Yb Yf[ ] Y]bh Ybg] j Yb `B Uhi f' j cb `Hf Ubg U _h]cb Yb `f Ygi `h] Yf Yb ž gck ] Y : f U[ Ygh Y ``i b[ Yb `ni f`G _U`] Yf V Uf _Y]h` V Yf Y]h Yb 'j ] Y`Yb I bh Yfb Y\a Yb `? cd Zn Yf Vf Y W Yb "`8 Y`c]hh Y`\YVh`\Yfj cf ž X Ugg I bh Yfb Y\a Yb `XYbbc W 'j cb `XYb '9] bgd Ufd ch Ybn] U`Yb `] b 6i W \ U`hi b[ ž 8 c _i a Ybh Uh] cb `i b X `K ] fhg W UZhgd f Ø Zi b[ `d f c Z]h] Yf Yb _Obb Yb " < ] Yf V Y] `_Obb Yb `f Y Xi b X Ubh Y`? cb h f c``d f cn Y gg Y`a ]b] a ] Yfh i b X `X] Y *\Dh Y [ f]h Ah Y `Y _h f cb] g W Yf `8 c _i a Ybh Y `_cgh Yb [ Øbgh] [ g] W Yf [ Ygh Y``h`k Yf X Yb" \]$$

9]b'k Y]hYfYf'5gdY\_h']gh'XYf'hUhgÀW\`]W\Y'9]bZi gg'Ui Z'X]Y
5fVY]hgk Y]gY']b'I bhYfbY\a Yb.'8]Y'5V`Ài ZY'\_ÒbbhYb'Xi fW\'XYb
9]bgUhn'j cb'6`cW\_W\U]b'fYj c`i h]cb]Yfh'k YfXYbž'k Ug
a Ò[`]W\Yfk Y]gY'gc[Uf'hfUX]h]cbY``Y'DfØZ b[Yb'cVgc`Yh'a UW\h''8]Y
7\UbW'ž'k]W\h][Y'i bX'\_ca d`YI Y'6Yk Yfhi b[gZfU[Yb'ni
hfUbgZcfa]YfYbž']gh'Ybcfa "'8cW\'XYf'K Y['ni f'j c``ghÀbX][Yb
\DhY[fUh]cb'i bX'ni a 'JYfghÀbXb]g'j cb'6`cW\_W\U]b!HYW\bc`c[]Yb
]a '5``hU[']gh'bcW\'`Ub["

8]Y??ca V]bUh]cb'Ui g'XYf'i a ZUggYbXYb'5bU`mgY'Xi fWX'8f"'N\Ub[i bX'XYf'VfY]hYb'DU`YhhY'Ub'5bk YbXi b[Yb'i bX < YfUi gZcfXYfi b[Ybž'X]Y']b'XYf'6`cW\_WXU]b!HYWXbc`c[]Y'ghYW\_Ybž a UWXh'XUg'6i WX'ni 'Y]bYa 'A i gg'ZØf'YXYbž'XYf'g]WX'Yfbgh\UZh'a ]h X]YgYa 'H\Ya U'Ui gY]bUbXYfgYhnYb'a ÒWXhY"'C V'ZØf'Ghi X]YfYbXYž 9bhgWXY]Xi b[ghfÀ[Yf'cXYf': UWX'Yi hY' 'XYf'9]bZi gg'XYf 6`cW\_WXU]b'\_ÒbbhY'k Y]hfY]WXYbXYf'b]WXh'gY]b"'8Ug'6i WX']gh'Yhnh Ui Z'5a Uncb'Yf\À`h`]WX'i bX'Y]b'GWXf]hhži a 'X]Y'K Y`h'XYf 6`cW\_WXU]b'VYggYf'ni 'VY[fY]ZYb"

8 Y hU]`g	
Cfh	EiYYb`AUfm'Ib]jYfg]hm'cZ'@cbXcbž'@cbXcbž
	l b]hYX <sup>-</sup> ?]b[ Xca
EiY``Yb	• k k k "ea i `"UWi _
	• k k k "cl ^ci fbU`"cf[
	• k k k "XY`c]hhY"Wca

6Ygi WXYb'G]Y'i bg'Ui Z'k ca, +"XY