

CghgYY!I f`Ui V. '?Ø\`i b[gVcfb']gh'XYf; Y\Y]a h]dd'ZØf'Gca a Yf'&\$&) °

?Ø\`i b[gVcfb'j YfnY]W\bYh'&\$&('Y]bYb'6cca ']a 'CghgYY!
Hci f]ga i g"'5hhfU_h]j Y'5b[YVchY'i bX'J YfUbghU`hi b[Yb
n]Y\Yb'; AghY'Ub"



?Ø\`i b[gVcfbž8Yi hgWk`UbX'!8Yf'Hci f]ga i g'Ub'XYf'CghgYY
Vcca hži bX'?Ø\`i b[gVcfb']gh'XUVY]'VYgcbXYfg'\cWk']a '?i fg"

a a Yf'a Y\f'; ÀghY'n]Y\h'Yg']b'XUg'WkUfa UbhY'GYYVUX']b

A YW_`YbVi f[!Jcfdca a Yfb"'K]Y'a c]b"XY'VYf]WkhYhž'j YfnY]WkbYh

X]Y'FY[]cb'gY]h'*J\fYb'Y]bYb'ghUV]`Yb'5bgh]Y['XYf

6Ygi WkYfnU\`Yb"'&\$&('fY]ghYb'fi bX'(+, "+, - 'A YbgWkYb'bUWk

?Ø\`i b[gVcfbž'k Ug'Y]bYa 'D`i g'j cb'Yhk U'' \$"\$\$\$'6Ygi WkYfb']a

JYf[`Y]Wk'ni a 'Jcf'U\f'Ybhgdf]Wkh"'9]b'[fc*Yf'HY]`'XYf

ni gAhn`]WkYb'; ÀghY'_Ua ']b'XYb'Gca a Yfa cbUhYb' 'U`Y]b']a '*']

i bX'5i [i gh'k UfYb'Yg'-"\$\$\$'a Y\f'U`g']a '*J\f'ni j cf"

K Ugʻa UW\h'?Ø\`i b[gVcfbʻgcʻUhhfU_h]j 3'8]Y'?ca V]bUh]cbʻUi g \Yff`]W\Ya 'GhfUbXž'i bVYfØ\fhYf'BUhi f'i bX'Y]bYa 'Vi bhYb J YfUbghU`hi b[gdfc[fUa a ']gh'XYf'GW\`ØggY`"'9j Ybhg'k]Y'XUg CghgYY!CdYb!5]f'i bX'XUg': Ygh]j U`' GYU'/ 'GUbX 'n]Y\Yb nU\`fY]W\Y'Hci f]ghYb'Ub"'A Uf]UbbU'¾ ghž'; YgW\ÀZhgZØ\fYf]b'XYf Hci f]ga i gž': fY]nY]h'i bX'?i `hi f'; a V<ž'VYhcbhž'XUgg'XYf'Gca a Yf XUg'< Ui dh[YgW\ÀZh']gh"': Øf'XUg': Ygh]j U`'&\$&) 'g]bX'VYfY]hg'' \$ DfcnYbh'XYf'H]W_Yhg'j Yf_Ui Zh"

$9]b^{\dagger}]Y^{\Delta}h][Yg^{5}b[YVch^{2}Øf^{U}^{Y}G]bbY]$

?Ø\`i b[gVcfb`\UhiUi W\`UVgY]hg`XYf`J YfUbghU`hi b[Yb`Y]bY`A Yb[Yni V]YhYb"'8]Y``Àb[ghY`GhfUbXdfca YbUXY`8Yi hgW\`UbXg``ÀXh`ni a : `Ub]YfYb`Y]b`i bX`X]Y`Y`Y[UbhY`CghgYYU``YY`j YfgdfØ\h bcghU`[]gW\Yg`: `U]f"`CV`]a ::]gW\fYghUi fUbh`cXYf`]b`Y]bYa `XYf GhYfbYfYghUi fUbhg` `X]Y`_i `]bUf]gW\Yb`5b[YVchY``UggYb`_Y]bY K ØbgW\Y`cZZYb"`K Yf`9f\c`i b[`gi W\hž`Z]bXYh`nU\`fY]W\Y`K Y``bYgg! A Ò[`]W_Y]hYb`k]Y`A UggU[Yb`cXYf`?bY]dd!5bk YbXi b[Ybž`X]Y VYgcbXYfg`]b`XYb`_À`hYfYb`A cbUhYb`[YgW\Ahnh`k YfXYbž'k Ybb__`UfY`@ Zh`Ui W\`XYf`; Ygi bX\Y]h`ni [i hY_ca a h"`

8 Yf '6 c c hg \ UZY b ž 'XY f 'gY]h' & \$\$ ('VY ghY \ hž'i b X 'Y]b Y 'A Uf]b Už 'X]Y D`Uhn 'ZØf'a Y\f'U`g' (\$\$ '6 c c hY 'V]Y hY hž'fi b XY b 'X Ug'a Uf]h]a Y 5 b [YV c h'UV " 8]Y '8 @F; !F Y hhi b [ggWk]a a Yf 'gcf[Yb'k À\fY b X' XY f < Ui d hg U]gc b 'X UZØfž 'X Ugg'g]Wk 'X]Y '6 UXY [ÀghY 'Ua 'gWk Òb Y b GUb X ghf Ub X'g]Wk Yf 'ZØ\ `Y b " : Øf'? i `hi fY`` ' = b hY fY gg]Y f hY '\ À`h'X]Y ?Ø\`i b [gV c f b Yf'? i b gh\ U``Y '[Ub n'À\f]['? c b n Y f hY 'i b X 5 i gghY``i b [Yb 'VY f Y]hž X]Y 'X Ug'5 b [YV c h' UV f i b X Y b "

8]Y'< YfUi gZcfXYfi b['[Ubn'À\f][Yb Hci f]ga i g

8 Y b b c W 'a i gg 'Ui W 'Ui Z'X]Y' < Y f Ui g Z c f X Y f i b [Y b 'Y]b [Y [Ub [Y b k Y f X Y b " 6 Ø f [Y f a Y]g h Y f]b 'C `]j]U '5 f b X h 'i b h Y f g h f Y]W h ž k]Y 'k]W h h [Y g ']g h ž '? Ø \ `i b [g V c f b 'Ui W ']b 'X Y f ' < Y f V g h! 'i b X 'K]b h Y f n Y]h 'Uhh f U_h]j ni '[Y g h U `h Y b " 8]Y 'X i f W g W b]h h `]W Y '5 i Z Y b h \ U `h g X Ui Y f 'X Y f '; Àg h Y a U['V Y] 'Z Ø b Z' H U [Y b '`]Y [Y b ž 'X c W 'X]Y 'B U W Z f U [Y 'b U W ? i f n n Y]h V i W i b [Y b 'a U W h 'X]Y 'D `Ub i b ['Z Ø f 'X]Y '6 f U b W Y 'b] W h Y]b Z U W Y f " K Y h h Y f i b V Y g h À b X] [_Y]h ']g h Y]b 'k Y]h Y f Y f ': U_h ž 'X Y b 'Y g 'n i

VYk À`h][Yb'[]`h"'8]Y'FY[]cb'\Uh'g]W\'U`g'AcXY``fY[]cb CghgYY_ØghY'dcg]h]cb]Yfhž'X]Y'b]W\h'bif'?Ø\`ib[gVcfbž'gcbXYfb Ui W\'FYf]_'ibX'6UX'8cVYfUb'ia ZUgghž'ia 'XYb'[Ubn'À\f][Yb Hcif]gaig'ni 'ZÒfXYfb"

8]Y'CghgYY'a]h']\fYf'GW\Òb\Y]h'`cW_hž'i bX'?Ø\`i b[gVcfb'k]fX Ui W\']b'XYb'_ca a YbXYb'\\J\fYb'Y]b'VY\]YVhYg'N]Y\'ZØf'U\'Y\Z'X]Y X]Y'?ca V]bUh]cb'Ui g'BUhi fz'?i `hi f'i bX'9f\c`i b['gi W\Yb"

8 Y hU]`g	
Cfh	?Ø\`ib[gVcfbž8YihgW\`UbX
EiY``Yb	• k k k "a c]b"XY
	k k k "_i Y\`i b[gVcfb"XY
	XY"ghUh]ghU"Wca

6 Ygi WX Yb 'G]Y 'i bg 'Ui Z 'X]Y!bUWX f]WX hYb "Wca