

## G\Uk b'A YbXYg'VY[Y]ghYfh'a ]h'nk Y] 5i Zhf]hhYb']b'8Yi hgW\`UbX'&\$&) °

G\Uk b'A YbXYg'\_ØbX][ h'9i fcdU!Hci fbYY'i bX'5i Zhf]hhY'VY]a Gi dYfV`cca ': Ygh]j U`'&\$&) ']b'? Ò`b'i bX'A ØbWXYb'Ub"'H] $W_Y$ hg UV'( "' $\Rightarrow$  b]°



? O`bž'8 Yi hgWk`Ub X '!'G\Uk b'A YbXYg'\UhrgY]bY'a ]h'GdUbbi b[
Yfk UfhYhY'Hci fbYY' Cb'H\Y'FcUX'5[U]b 'Ub[Y\_ØbX][hž'X]Y']a
5i [i gh'&\$&) 'VY[]bbYb'k ]fX"'BUWk 'gY]bYa '\_Øfn`]WkYb'Hf]d'bUWk
@UhY]bUa Yf]\_U'\_Y\fh'XYf'\_UbUX]gWkY'DcdghUf'ZØf'nk Y]'5i Zhf]hhY
bUWk'8 Yi hgWk`Ub X'ni fØW\_"'5a '%&"'5i [i gh'k ]fX'Yf']b'XYf'@UbI Ygg
5fYbU']b'? O`b'Ui ZhfYhYbž'[YZc`[hjcb'Y]bYa '5i Zhf]hhVY]a
\_c``Y\_h]j Yb': Ygh'XYf'A i g]\_'i bX'?i `hi fž'XYa 'Gi dYfV`cca ': Ygh]j U`ž
Ua '' %"'5i [i gh']b'A ØbWkYb"'8 Yf'[YgUa hY'NY]hfUi a 'XYf'Hci f
YfghfYW\_h'g]Wk'j cb'5i [i gh'V]g'C\_hcVYf'i bX'i a ZUggh'nU\`fY]WkY
5i Zhf]hhY']b'9i fcdU'i bX'BcfXUa Yf]\_U"'8 Yf'H]W\_Yhj cfj Yf\_Ui Z
ghUfhYh'Ua '("'\$b]'i a '%\$'I \f'ZØf'fY[]ghf]YfhY': Ubgž'k À\fYbX'XYf
OZZYbh']WkY'J Yf\_Ui Z'Ua '\* "'\$b]'VY[]bbh"H]W\_Yhg'g]bX'ØVYf'X]Y
cZZ]n]Y``Y'K YVg]hY'j cb'G\Uk b'A YbXYg'Yf\À`h']Wkž'k cVY]'X]Y'DfY]gY

 $\label{eq:confine} Z\!\emptyset f^*XUg^*9]bnY^*\_cbnYfh^*]b^*?O^*b^*g]W^*Ub^*XYb^*DfY]gYb^*j^*Yf[^*Y]W^*VUfYf^*JYfUbghU^*hi^b[^Yb^*k^]Y^*JY^*j^*cb^*6]^*]Y^*9]^*]g^*i^*bX^*@]cbY^*F]W^*JY^*Cf]Ybh]YfYb''^*$ 

8]Y'9i fcdU!Hci fbYY'i a ZUggh'a Y\fYfY'\cW\\_UfÀh][Y': Ygh]j U`g i bX'?cbnYfhgÀ`Y"Ni `XYb`HYfa ]bYb`[Y\ÒfYb`i bhYf`UbXYfYa 5i Zhf]hhY`VY]`[fc»Yb': Ygh]j U`g`k ]Y`XYa `Gn][Yh': Ygh]j U``]b 6i XUdYgh'i bX`XYa `: fYei YbWm': Ygh]j U``]b'² ghYffY]WX"'\#b`XYf , VYfg]WXh'g]bX`X]Y'9i fcdU!HYfa ]bY`ZØf`G\Uk b`A YbXYg Ui Z[Y`]ghYh

- &"'5i [igh.'Gibbm'<]``: Ygh]j U`ž'Df]g\h]bU'fpcgcjcŁ
- ) "'5i [i gh. 'HUi fcb '5fYbUž'? fU\_Ui 'fDc 'YbŁ
- +"5i [i gh. Gn][Yh: Ygh]j U`ž'6i XUdYgh'fl b[UfbŁ
- - "'5i [i gh. 'Ga i \_ZYghž'G\_UbXYfVcf[ 'fBÀbYa Uf\_Ł
- %&"'5i [i gh.'@Ubl Ygg'5fYbUž'? Ò`b fBYi hgW\`UbXŁ
- %("'5i [igh.': fYeiYbWm': Ygh]j U`ž'GUb\_h'DÒ`hYb'ff ghYffY]WXŁ
- % \* " 5 i [ i gh 'H\Y'C & ž'@cbXcb'f| fc » Vf]hUbb]YbŁ
- &\$"'5i [i gh.'N][[c'8ca Yž'5a ghYfXUa 'fB]YXYf`UbXYŁ
- &&"'5i [igh.'NØf]W\'CdYbU]fž'NØf]W\'fGW\kY]nŁ
- &\* " 5i [i gh A cj ]ghUf 5fYbUž A UXf]X fGdUb]YbŁ
- &, "'5i [igh.'A 9C'5fYbUž'@]ggUVcb'fDcfhi [U`Ł
- '%"'5i [igh.'GidYfV`cca : Ygh]j U`ž'A ØbWXYb'fBYi hgWX`UbXŁ

## 8YhU]`g`ni a `Gi dYfV`cca : Ygh]j U` &\$&)

 $8 \ Ug'Gi \ dYfV`cca :: Ygh]j \ U``Z]bXYh'Ua '' $"'i bX'' %"'5i [i gh']a \\ A \ \emptyset b W b Yf'C `ma d] Ud Uf_ i b X 'C `ma d] UghUX]c b `ghUhh'' 9g' k ]fX \\ VYfY]hg'ni a 'j ]YfhYb'A U``Ui g[ YhfU[ Yb'i b X 'V]YhYh']b `X]YgYa '\$U\f Y]b Y'FY]\Y'j c b 'b Ua \UZhYb''? Øbgh`Yfb''' 8 Ug': Ygh]j U``k ]fX'X]Y \\ < YUX`]b Yf'G\Uk b'A Yb X Ygž'Dcgh'A U`cb Y'i b X '< cn]Yf'df ÅgYbh]YfYb'' K Y]hYfY 'V Ygh Åh][ h'? Øbgh`Yf'g]b X'B Y``m': i fhUXcž'H]Çghc'i b X 'b Yi YfY HU`YbhY'k ]Y'F 5 M9'i b X'7 cb Ub'; fUm'' 8]Y'H]\W_YhdfY]gY'Z\Øf'XUg : Ygh]j U`'j Uf]]YfYb ž'a ]h'HU[ Ygh]\W_Yhg'UV'\%'- '9i fc'i b X K c\WXYbYbXh]\W_Yhg'UV'\&$( '9i fc'': \Øf': Ua ]`]Yb'[ ]Vh'Yg'Ui \WX gd Yn]Y``Y'?]b XYf!'i b X'\$[ Yb X`]\WXYb!H]\W_Yhg'ni 'Yfa Å\][ hYb DfY]gYb''$ 

8]Y'Cf[Ub]gUhcfYb'VYhcbYbž'XUgg'XUg'Gi dYfV`cca': Ygh]j U`'b]W\hbifaig]\_U`]gW\Y'9f`YVb]ggY'V]YhYhž'gcbXYfb'Ui W\'6YfY]W\Y'ZØf?ibgh'ibX'K]ggYbgW\UZYb'a ÒW\hY''8Yf': Ygh]j U`VYgi W\Yf\_Ubb'g]W\'Ui Z'Y]bY'VibhY'A]gW\ib['Ub'IbhYf\U`hib['ZfYiYbž'X]YUi W\']bhYfU\_h]j Y'ibX'V]`Xib[gcf]Ybh]YfhY'9fZU\fib[Yb'ia ZUggh''8]Y'j Yf[Ub[YbY'5ig[UVY'XYg': Ygh]j U`g'\UhhY']bhYfbUh]cbU`Y'GhUfgk]Y'B]U```<cfUb'ibX'Hc\_]c'<chY`ni'V]YhYb''

 $: \emptyset f ``U``Y \check{z} `X]Y ``Ub `XYb ``VYj cfghY \YbXYb ``9fY][b]ggYb `]bhYfYgg]Yfh g]bX\check{z} []VhYg ``nU\`fY]W\Y' = bZcfa Uh]cbYb ``ibX ``5b[YVchY ``UiZ'a mXYU`n ``ibX `a mgY`Z'' ``9g`k]fX `Ya dZc\`Ybž'H]W_Yhg`Zf\emptyset \nY]h][``nig]W\Yfbž'XU'X]Y ``BUW\ZfU[Y'\cW\`gY]b`X\ØfZhY''$ 

G\Uk b`A YbXYg`FØW\_\_Y\f`bUW\`9i fcdU`i bX`gY]bY`5i Zhf]hhY`]b 8 Yi hgW\`UbX`j YfgdfYW\Yb`Y]b`i bj Yf[ Ygg`]W\Yg`9f`YVb]g`ZØf A i g]\_`]YV\UVYf`i bX`: Ubg`XYg`? Øbgh`Yfg`ni `k YfXYb"`8]Y`J cfZfYi XY Ui Z`X]Y`Hci f`i bX`XUg`Gi dYfV`cca `: Ygh]j U``k ÀW\gh`VYfY]hgžii bX X]Y`YfghYb`H]W\_Yhg`g]bX`VU`X`Yf\À`h`]W\"

8 Y hU]`g	
J c fZU``	Gcbgh][ Yg
Cfh	?Ò`bž'8Yi hgWX`UbX
EiY``Yb	• k k k "fi \f&( "XY
	• a U[ Un]b"a mXYU`n"XY
	• k k k "a mgY`Z"XY

6 Ygi W Yb 'G]Y 'i bg 'Ui Z 'b!U[ "bYh