

JYfg]WXYfib[g]bbcjUh]cb. @UVcfg ZcfgWXYb [Y[Yb'?`]a Uk UbXY`!F]g]_Yb°

8 Ugʻ-9'J ⇒ '+bgi fUbW''UbX'HYW\'@UV'i bhYfgi W\h']bbcj Uh]j Y @Ògi b[Yb'ZØf'JYfg]W\Yfi b[Yb'Ub[Yg]W\hg'XYg ?`]a Uk UbXY`qž'i bhYfghØhnh'j cb'[`cVU`Yb'9|dYfhYb"



I bhYf'XYf'@Y]hi b['j cb'J]nY!8Y_Ub'DfcZYggcf'; Ï a Yn!I ``UhY'k]fX XUg'YfghY': cfgWki b[gdfc'Y_h'XYg'@UVcfg'Y]b'\Y]» Yg'9]gYb UbdUW_Yb.'X]Y' 5i gk]f_i b[Yb'XYg'?`]a Uk UbXY`g'Ui Z'@YVYbg!'i bX?fUb_Ybj Yfg]WkYfi b[Yb'''7c!J cfg]hnYbXYf'=_\`Ue'G]X\i 'VYhcbhž k]Y'k]Wkhj['\cWkYfhj[Y': cfgWki b[']ghž'i a 'X]Y JYfg]WkYfi b[gVfUbWkY'ZØf'X]Y'_ca a YbXYb'<YfUi gZcfXYfi b[YbZ]h'ni 'a UWkYb'''<Ufhk]['@Ò[Yfž'XYf'79C'XYf'J \= ž'Yf`Ài hYfhž'XUgg HYWkbc`c[]Yb'XYf'6fUbWkY'\Y`ZYb'_ObbYbž'XUg'B]j YUi 'XYf JYfg]WkYfVUf_Y]h'Ui ZfYWkhni Yf\U`hYb'i bX'gc[Uf'ni 'j YfVYggYfb' Y]b'YWkhYf'; Yk]bb'ZØf'X]Y'JYfVfUi WkYf'i bX'I bhYfbY\a Yb''

?`]a Uk UbXY``U`g`GW\`ØggY`ZU_hcf

8 Y fr? `]a Uk Ub XY`ghY``h'b]W\h'bi f'X]Y'; YgY``gW\UZh'Ui Z'X]Y'DfcVYž gcbXYfb'Ui W\X]Y'JYfg]W\Yfi b[gk]fhgW\UZh''8 Uj]X'; Ïa Yn!I ``UhY Yf_`Àfhž'XUgg'Xi fW\XXYb'?`]a Uk Ub XY``X]Y'F]g]_c`Ub XgW\UZh XfUgh]gW\'j Yf\Ab XYfh'k]fX'''JYfg]W\YfYf'a ØggYb']\fY'hfUX]h]cbY``Yb A cXY``Y'ØVYfXYb_Yb'i bX'g]W\'bYi Yg'K]ggYb'UbY][bYb''8 Ug'=9 J \Rightarrow \DX'HYW\'@UV'Vf]b[h'?`]a Uk]ggYbgW\UZhž 8 UhYbk]ggYbgW\UZhi bX'U_hi Uf]Y``Y'9I dYfh]gY'ni gUa a Ybžii a _ca d`YI Y'8 mbUa]_Yb'VYggYf'ni 'j YfghY\Yb'i bX'XYf'6fUbW\Y K Yf_nYi [Y'Ub'X]Y'<UbX'ni '[YVYbžii a 'I bg]W\Yf\Y]hYb'ni bUj][]YfYb''\DY\BY\a YbX'i bg]W\YfYb'K Y'h']gh'X]Yg'a Y\f XYbb''Yb\Dh]["

9]b k Y]hYfYg [i hYg 6Y]gd]Y`ZØf XYb 9]b Zi gg XYf

J Yfg]W Yfi b [gk]fhgW UZh Ui Z'X]Y [fØbY HfUbgZcfa Uh]cb `]Y ZYfh XYf

; YgUa hj YfVUb X XYf 8 Yi hgW Yb J Yfg]W Yfi b [gk]fhgW UZh fl 8 J Ł"

6Y] Y]b Ya 9 I dYfhYb [Ygd fÀ W]b 6 fØggY`k i fXY ØVYf X]Y F c``Y j cb

J Yfg]W YfYfb U`g HfY]VYf XYf b UW \ U`h][Yb K Yb XY X]g_i h]Yfh" 9g

[Y\h'b]W h'bi f'i a XYb GW i hn j cf B Uhi f_UhUghfcd \ Yb ž gcb XYfb

Ui W i a X]Y I bhYfghØhni b ['j cb']bbcj Uh]j Yb 5 bgAhnYb i b X

GhfUhY[]Yb 'ni f'DfAj Ybh]cb i b X ??`]a UZc`[YbUbd Uggi b ["

$8]YGWihn\@W_YgWX\]Y > Yb$

9]b'VYXfØW_YbXYg'9f[YVb]g'XYf'9l!?ca a]gg]cb'nY][h'Ui Z'6]g'ni nk Y]'8f]hhY`'XYf'?`]a UZc`[YgW\\AXYb'nk]gW\Yb'\&\\$%'i bX'\&\\$%-

k UfYb']b'A]h[`]YXghUUhYb'b]W\hij Yfg]W\Yfh"8]Y'j YfVYggYfhY 5Vg]W\Yfi b['j cb'?`]a UgW\ÀXYb']gh'XU\Yf'Vf]gUbh"8Yf'7`]a UhY FYg]`]YbW'8]U`c[i Y'ff7F8\£ž']b]h]]Yfh'j cb'XYf'9i fcd\A]gW\Yb?ca a]gg]cbž'\Uh'ni a 'N]Y`ž'X]Y'I fgUW\Yb'X]YgYf'GW\i hn`\Ø\W_Y'ni]XYbh]Z]n]YfYb"'8Yf': c_i g'`]Y[h'Ui Z'Df\Aj Ybh]cbg!'i bX 5bdUggi b[ga U»bU\a Yb"'C`]j Yf'<Ui bYf'j ca '; 8J'k Ufbh'j cf i bj Yf\\A`hb]ga \A`»][Yb'[YgYhn`]W\Yb'Jcf[UVYbž'X]Y'XYb ZcfhgW\f]hh`]W\Yb'HfUbgZcfa Uh]cbgdfcnYgg'[YZ\\fXYb'_\ObbhYb"

 $A \]h'Y]bYa '_`UfYb': c_i g'Ui Z'BUWX \setminus U`h][_Y]h'gYhnYb'XYi hgWXY \\ J Yfg]WXYfYf'Ui Z'Y]bYb'\c`]gh]gWXYb'5bgUhn'ni f'6Yk À`h][i b['XYf ?`]a Uf]g]_Yb''`Gc YbhghY\h'Y]b']bhY[f]YfhYg'FU\a Ybk Yf_<math>z$ 'XUg'X]Y $C \ ZZYb`Y[i b['j cb'_`]a UVYnc[YbYb'F]g]_Yb']b'XYf \\ J Yfg]WXYfi b[gVfUbWXY'ZÒfXYfh''`9]b'D]`chdfc Y_h'i bhYfghØhnh'Xi fWX Dk 7'n]Y`h'XUfUi Z'UVz'X]Y'6Yk Yfhi b['X]YgYf'F]g]_Yb'ZØf \\ j YfgWX]YXYbY'J Yfg]WXYfi b[ggdUfhYb'ni 'ghUbXUfX]g]YfYb''`<]YfVY] \\ k]fX'Y]b'VYgcbXYfYg'5i [Yba Yf_'Ui Z'd\mg]gWXY'i bX \\ , VYf[Ub[gf]g]_Yb'[Y`Y[hz'i a 'gc`]XY'F]WXh`]b]Yb'ZØf \\ J Yfg]WXYfi b[gdcfhZc`]cg'ni 'Ybhk]W_Y`b''$

8]Y'JYfg]WXYfi b[gk]fhgWXUZh'ghY\h'U`gc'b]WXh'bi f'j cf
<YfUi gZcfXYfi b[Ybž'gcbXYfb'\Uh'Ui WX'X]Y'7\UbWYž'Y]bY
bUWX\U`h][Y'Ni _i bZh'U_h]j 'a]hni [YghU`hYb"'Gc``hYb'I bhYfbY\a Yb
i bX'JYfVfUi WXYf'_`i ['i bX'j cfUi ggWXUi YbX'\UbXY`bž'_ÒbbhY'XYf
GY_hcf']b'XYf'[fØbYb'HfUbgZcfa Uh]cb'Y]bY'GWX`ØggY`fc``Y
Y]bbY\a Yb' 'gY]'Yg'Xi fWX'dfÀj Ybh]j Y'A U» bU\a Yb'cXYf
]bbcj Uh]j Y'JYfg]WXYfi b[gdfcXi _hYž'X]Y'XYb'?`]a Uk UbXY`
UXfYgg]YfYb"

 $\pm iX]YgYa$ $G]bbY'gWXUi Yb'k]f'[YgdUbbh'Ui Z'X]Y'9bhk]W_i b[Yb']a$ $\pm 9'J \neq -i\pm gi fUbWY'UbX'HYWX'@UV'i bX'X]Y'hfUbgZcfa Uh]j Y'?fUZh'XYf$ $JYfq]WXYfi b[Yb']b'Y]bYf'ni bY\a YbX'i bq]WXYfYb'K Y`h''$

: Øf'k Y]hYfY' ⇒Zcfa Uh]cbYb'g]Y\Y'Ui W\. '9XHYW\' ⇒bcj Uh]cb'<i V
ž'; 8Jž'i bX'Dk 7"

8YhU]`g	
Cfh	A UXf]Xž [·] GdUb]Yb
EiY``Yb	• k k k "YXhYW\]bbcj Uh]cb\i V"Wca
	• k k k "[Xj "XY
	• k k k "dk WXY

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